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Some Notes on Treatment of Interest to Clinicians.*

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If one looks through some of our veterinary literature one will find that, as a general rule, an essayist generally prefaces his paper by an apology. As one who is unorthodox in many ways, I am going to deviate from this well-established custom. In my case any blame that may be attached to my effort is entirely due to your Secretary; he is one of the most persistent and annoying men I know. He will not leave you alone, and, in the end, although it may take years, you are glad to take the easiest way out and fall in with his wishes.

To read a paper before the "Central" is not the simple matter that, to the uninitiated, it looks to be. If one looks at the list of previous papers and writers, one realises that the list is very "highbrow," both in subjects and personnel. Unfortunately, or fortunately, I am not by any means what one could call "highbrow." To the non-"highbrow" the time has come when it is even difficult to choose the title of a paper. I have found some difficulty in fixing upon a subject, or subjects, which would satisfy two conditions: (1) That I knew something about; (2) That had not been already discussed.

Being fortunately, or *vice versa*, a medical man, it was suggested by some kind friends that I should dissertate on, say, "The Diseases of Animals communicable to Man." This suggestion, I may say, left me cold; in fact, I am "fed up" with this subject, as I am sure many of my veterinary friends are. I think that it is about time that veterinary surgeons worried less about the human animal and payed more attention to the domestic animals and their diseases and treatment.

As one of the non-"highbrows," you will realise my difficulties and understand why I have chosen what one might call a variety paper principally clinical in type.

A subject in which I have been interested for some time is Intravenous Therapy. Most people have "a bee in their bonnet," and I think that this subject must have been mine, for at one time I was seized with the desire to give animals all sorts of drugs by this method. My zeal was arrested when one day I thought that arecoline might be quicker in action when given that way. It was; in fact, it was quicker than I, for the horse fell dead before I could remove the needle from the vein. Amongst medical men, the intravenous administration of drugs is well established, but among veterinarians it has never been a popular method of treatment.

The outstanding advantages of this treatment are: (1) The dose can be more accurately administered; (2) Rapid results: in most cases drugs act more promptly when placed directly into the circulatory system; (3) Drugs can be given, by this method, which are chemically changed or rendered inert by the action of the alimentary secretions; (4) Irritation of the alimentary tract can be often avoided.

To give a drug intravenously does not, in all cases, mean that one will get no intestinal irritation. Those drugs which produce their effect by some action on the bowel wall will still have the same effect. One can get very considerable intestinal irritation when using the various arsenic and mercury preparations in the treatment of syphilis. As a general rule, it is considered that medicines which are to produce their effect by some action on the alimentary tract are best given by the mouth. On the other hand, drugs which act on the circulatory system or some distant tissue or organ usually seem to be most effective when given intravenously.

Lately, I have confined my efforts to the administration of formaldehyde, chloral and anti-tetanic serum; these three substances have been, in my experience, most efficacious.

I have been unable to get any of my friends to try these drugs by the intravenous method. In the veterinary profession there seems to be a general fear of the ill-effects associated with an intravenous injection either at the time of operation or subsequently. The entrance of air, hæmorrhage, infections leading to thrombosis and phlebitis, and the entrance of irritant substances into the tissues around the vein are only a few of the many so-called difficulties. To my mind, if ordinary sterile precautions are taken only one of these evil results can possibly ensue—that is, the entrance of irritant material into the tissues.

Bearing this in mind, whenever I give an intravenous injection I take the following precautions:—

(1) When the needle has been inserted into the vein I let the vein collapse. I then again raise the vein and, if the needle is in securely, a good stream of blood will flow.

(2) When the injection is completed and before withdrawing the needle, I again raise the vein and wash the needle with a good stream of blood. When an intravenous needle is withdrawn there is always a likelihood that the fluid still remaining in its bore will be sucked into the tissues. If the needle still contains some of the fluid used in the operation, the chances are that you will get an abscess and its subsequent complications. If, however, attention is paid to the flushing of the needle by blood, then any liquid escaping into the tissues will be blood, and no ill effects will ensue.

My experience with intravenous treatment in veterinary practice has been practically confined to the horse. The technique and apparatus are simple. As regards apparatus, all that is necessary is a needle, a funnel and a length of tubing. The fluid used is poured into the funnel and allowed to gravitate into the vein. The needle I use is a large one with a correspondingly large bore. It also possesses an adaptor in order that the tubing may be easily connected with the needle after the latter has been inserted.

I use a large bore needle in order to get the operation over as quickly as possible, for, in the case of formaldehyde and chloral, with a small bore and consequent slow stream, the animal may become restive or fall before one can withdraw the needle with precautions. The jugular is the vein used and it can be readily raised by thumb pressure.

In thick-skinned horses it is often necessary to nick the skin at the site of operation to ensure the easy insertion of a large needle. In nervous animals a little local anæsthetic is useful. A twitch is the only means of restraint necessary.

Formaldehyde.

I have used this drug intravenously in two types of cases: (1) Respiratory, principally in cases of chronic catarrh; (2) In purpura hæmorrhagica. It is in purpura hæmorrhagica that I have had most success and, judging from my own experience, I consider this drug, when given intravenously, a specific. From ʒi-ʒiii of the 40 per cent. formaldehyde is injected in ℥viii-℥x of boiled or sterile water. I graduate the dose according to the size and condition of the animal. I find that a good class cart horse will take up to ʒiii formaldehyde with no noticeable disturbance. I have known ʒiv to be given in mistake without any ill-effects. In very debilitated and weak animals the dose should be diminished. As one is giving the injection the animal may get very rocky on

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its feet and then it is advisable to stop the administration at what one would consider a danger point. One can repeat the dose daily if necessary, but so far I have not met an animal that needed more than three doses. In most cases one or two injections are quite sufficient. My first case was a very fortunate one. I injected ℥x of solution (℥i) by means of a 5 c.c. Record syringe, there being nothing else available at the time. The operation took some time to complete. Before I had finished the swellings in the head region had begun to subside, much to the owner's and my own amazement. My other cases have not been so dramatic. For the last three or four years my supply of subjects has been very small, but last summer I saw, in consultation with a veterinary surgeon, a cart horse which made a wonderful recovery. I had a standing agreement with this veterinary surgeon that when he had a case in his opinion past all other treatment he would try formaldehyde. The animal looked beyond hope, but we determined to give the treatment a trial. Success attended our efforts, the animal improving from the first injection. Two injections sufficed. This veterinary surgeon tells me that he has had two similar cases since, with like results.

Any other treatment, as far as I know, can be combined with this method of administration. My own custom is to follow the old maxim—rest, under the best hygienic conditions, *plus* some mild febrifuge in the drinking water. On occasion I have also given ℥i doses of formaldehyde *per orem*. It is interesting to note, in connection with formaldehyde, that perchloride of mercury, $\frac{1}{64}$-$\frac{1}{10}$ gr., has been found very useful (Dr. H. Pritchard) in cases of pneumonia (lobar and lobular), acute staphylococcal infections, chorea, subacute rheumatism, chronic infective arthritis and sleepy sickness.

How do these substances (formaldehyde and mercury) both powerful antiseptics, produce these effects? It cannot be as disinfectants; the quantities being too small when diluted by the blood.

Chloral.

When a veterinary surgeon does a major operation on any of the larger animals it is surprising how much of his fee, that is if he is an ordinary veterinary surgeon, goes in paying for help in casting, etc. Being of Scotch descent, I looked about to see if I could obviate this expense. I had heard that chloral was very good as an anæsthetic when given intravenously, but that there were the usual complications associated with it. If one takes the simple precautions which I have stated previously, these complications need never arise. Chloral intravenously is, in my opinion, a simple and safe anæsthetic. The technique is the same as for formaldehyde. The strength I use is a 1 in 3 solution, *i.e.*, 1 chloral—2 H_2O. The minimum dose I have given has been ℥ii of the solution. I graduate dose, again, as regards type, size and condition—℥ii chloral is quite sufficient for a cob and about ℥iv for a large cart horse. These doses are greatly modified by condition; poor, debilitated animals needing only small doses. One does not require a lot of space in which to put the horse down. I find that a roomy, loose box is sufficient for safety. The animals generally fall directly they have had the injection, but sometimes they may walk a few steps and then lie down. If the dose is sufficient they become immediately unconscious, rendering the application of hobbles or other means of fixation for the purposes of operation a simple procedure. The duration of anæsthesia depends upon the dose and the animal; in any case, it is sufficient for any of our purposes—two hours or so. One defect of this method of anæsthesia is that the animals do not come round as quickly as after $CHCl_3$, etc. This is no real detriment, however, as the animal can be left lying with no ill-effects and he will get up in his own good time. One horse I operated upon for amputation of the penis was put down at 2-30 p.m. and did not rise till 10 p.m. This animal was in a very weak and debilitated condition. When an operation is finished, one can safely leave the animal and get on with another if necessary. One afternoon I had a field day and at one time I had three black funeral stallions lying sleeping under chloral in proximity to one another. With chloral a veterinary surgeon can do with one assistant what it previously took at least five to do. I have operated upon horses, using chloral, for such things as poll evil, fistulous withers, quittors, shoe boils, neurectomy, eye and dental operations. I have found it particularly useful in dental work.

Intravenous Therapy in Tetanus.

I have used this method in administering anti-tetanic serum. To my mind, it is the most sensible way of giving a serum, especially when one desires a quick result, as in tetanus. I may say here that my late chief, Dr. Fildes, who is probably the most experienced bacteriologist concerned with human tetanus, can see no advantage in this method. If anti-tetanic serum is to be of any use as a curative it must be given in large doses and into some spot from which it can be absorbed readily and reach the central nervous system. In the human, these two conditions are fulfilled by injecting it into the subdural space of the spinal cord. A sufficient quantity of cerebro-spinal fluid is removed to make room for the injection. To my mind, intra-spinal treatment in the horse is impracticable and so I pin my faith to the next best, namely, intravenous. Treatment is likely to be somewhat costly, but if the animal is of a fair commercial or sentimental value, it is well worth a trial. I generally tell the owner that the treatment will cost, in serum alone, £5 to £6, that the prognosis is fair, but by no means certain, and then leave them to decide for themselves whether it is worth it. With this method of treatment I have had 10 successful cases, with two deaths. In all these cases symptoms were well marked. One of the subjects, a cart horse, has had the disease twice and has recovered each time. I seldom now give up hope unless the case is palpably beyond help. Apart from this intravenous treatment there are one or two points which I consider of great importance.

(1) If one can find the site of entry of the bacillus and deal energetically with that area by excision, cautery, etc., it is a great help. It seems reasonable that if one can stop the factory manufacturing any more toxin one's hopes are enhanced.

(2) The period of incubation. It is a well-known fact that the longer the period of incubation, the greater are the chances of success. I think that practically no animal should succumb that has an incubation period exceeding seven days.

(3) The tetanus bacilli vary greatly in their potency. This is a fact which was established by Dr. Fildes two or three years ago. Some strains have little or no pathogenic effect; some are quite harmless.

In human cases I think that it is more or less a general rule that no one recovers who has shown definite clinical symptoms. It may therefore follow that some of my cases have been infected with some bacilli of lesser virulence. The tetanus bacillus has a very wide distribution and it is hardly possible to find any soil from which it cannot be cultivated. In the light of this information, it would be interesting to ascertain what proportion of wounds of the extremities in animals are infected at some time or another by the bacillus of tetanus. As regards dosage, I give intravenously anything from 18,000 to 40,000 units, depending upon the severity of the case, the discovery or not of the site of inoculation and the general condition of the animal. There is no reason why the dose should not be repeated, the amount of such dosage depending upon the progress made.

I would like to hear the opinions of other veterinary surgeons on this method of treatment, for I know that the Fellows of this Society must have much greater experience than I. A country practitioner I know has had five cases and four deaths within the last month. I may say that his method of treatment was not mine.

The Treatment of Laminitis.

I would like to bring to your notice two points with regard to the treatment of this disease.

(1) The use of adrenaline in the early acute stage. This is a drug that I favour in the early or congestive stage of the disease. Good results can be obtained if it is injected over the course of the plantar vessels. In theory, it is correct treatment, for if one can diminish the volume of blood flowing into the foot one would naturally expect that the total volume of blood in the foot would be diminished. I understand that in the early stages laminitis is simply an acute congestion of the vascular structures contained in the foot. Pain and most of the damage sustained are due to the pressure of this excessive amount of blood in a non-distensible structure.

It has been my practice to give an injection of 5 c.c. of a 1 in 1,000 solution of adrenaline over the plantar vessels just above the fetlock—2½ c.c. on each side. I have had a number of favourable results, but I can record one occasion on which I treated five animals at the same time and with satisfaction. It occurred when I was in the R.A.V.C. and in Kurdistan. One evening five horses of the Assyrian cavalry came into camp, all very lame. The men had had a long trek and they had great difficulty in reaching the camp. By the time I saw these animals (half an hour) their fore feet were literally stuck to the ground and they showed all the symptoms of acute laminitis. Adrenalin was given and in about twenty minutes the horses were walking fairly easily. I had them walked and one could see the improvement progressing. To assist the cure I had the horses standing in a cold running stream all night and in the morning they marched with the column. They were perfectly well, and remained so.

The remedying of foot defects following laminitis. An old Arab dealer once demonstrated to me his method of curing dropped sole and flat feet in horses. His experiment was performed on a valuable Arab pony "which belonged to the renowned Colonel Leechman." I had tried all I knew and had failed. His method consisted of chopping off the toe of the hoof roughly at an angle of 45° with the sole. He chopped until he drew so much blood that I thought he would damage the pedal bone. He cauterised the bleeding surface and fitted an Arab shoe, which was bent to suit the contour of the mutilated hoof.

The animal was literally walking on his heels and his quarters—he had no toe to walk on. Six months afterwards I saw the same horse and the improvement was remarkable. I have since tried this treatment, not so drastically, and I find that there is certainly a tendency for the foot to assume its normal shape even when shod with such a slight modification of the Arab's principle as a so-called Blenkinsop shoe.

Have any of the Fellows of this Society experienced what a wonderful temporary bar shoe can be made by simply knocking off the toe clips and reversing the ordinary shoe? It was demonstrated to me some years ago by an old veterinary surgeon who often reversed a shoe, and I have tried it many times with the best of success.

The Use of Turpentine in Muscular Atrophy and Deep-Seated Lameness.

The atrophy of disuse following such things as shoulder and hip lameness is one of the bugbears of horse practitioners. The animal has not the full use of his limb and he may even be lame long after the original cause of the trouble has been relieved.

In such cases I have found that the intra-muscular injection of turpentine is often most successful. It seems to act as an intra-muscular blister. In what way it produces its results I do not know. Five c.c. of turpentine can be injected at multiple points around a hip joint. In a few minutes there is intense irritation. In twelve to twenty-four hours a large swelling surrounds the area involved and most of the irritation has gone. Hot fomentations are next prescribed and in two or three days the swelling may have disappeared, or it persists and fluctuates. If fluctuation is marked, the swelling should be opened, when quantities of a creamy fluid, resembling pus in appearance, will exude. In a week or so the lesion will have practically resolved and one can put the animal on light exercise. In many cases one can follow with the eye the progressive increase in volume of the wasted muscles. I have also found this intra-muscular injection of turpentine of great use in deep-seated lameness in the shoulder and in the hip joint. It has helped when all else has failed.

This brings me to the end of my effort. I hope that I have not bored you, and that a good discussion will ensue.

Discussion.

Professor A. R. Smythe, who opened the discussion, said: I feel sure that we are all grateful to Professor McCunn for giving us a very interesting paper. It is one that should give rise to a good discussion, which may be of a somewhat controversial nature, and I will state at the outset that there are many points in it which I view from a somewhat different angle.

It is perhaps due to his medical training that Professor McCunn holds intravenous injection in such esteem; possibly man is a more suitable subject for this form of administration, as control of movement does not arise to the same extent and, moreover, man is more prone to several conditions to which this line of treatment has been specially adapted—I refer more especially to syphilis, surgical shock and profuse hæmorrhage.

The essayist might even have confined his thesis to this subject—he could have discussed the rival claims of trypan blue and potassium antimony tartrate in bovine redwater, dextrose in parturient paresis, shock, acidosis, formalin in Johne's disease, and iodine in foot-and-mouth disease. The technique associated with intravenous injection is not intricate and if one could guarantee that the animal would remain perfectly still the procedure would not be difficult; unfortunately, it is the sudden and unexpected movements which lead to some of the undesirable results the essayist enumerates.

The method described by Professor McCunn appears to have one weak point, there seems to be no check or guarantee that air will not enter the jugular vein. It is generally conceded that if air enters the venous system and reaches the heart a condition of air block, or heart block, arises, leading to immediate death; possibly the matter has been misrepresented and I should like to know how much air may be allowed to enter the jugular vein of a horse without fatal result. I am not prepared to admit that all danger in this procedure arises from faulty technique and I suggest that irritant drugs may of themselves set up a phlebitis followed by thrombosis, and I place chloral hydrate in this category. The intravenous injection of formaldehyde is by no means a new method of treatment and I believe it was tried out a good many years ago in conjunction with chinosol in human tuberculosis.

In the gangrenous pneumonia of horses, so common in France during the war, it was given an extensive trial. Its use in purpura in horses is of great value in view of the intractable nature of the disease, which does not always respond to those few drugs which have been recommended for many years.

Professor McCunn appears to have been rather fortunate in his percentage of recoveries with this line of treatment; Imrie, who has used this method for a considerable time, in his article to the *Veterinary Record* in October, 1926, states that these is a type of case which does not appear to benefit from the formalin treatment. What explanation has Professor McCunn to offer regarding the action of formalin in purpura? Is it lethal to a causal organism, or is the action a purely mechanical one due to alteration in the permeability of the capillary walls by the hardening action of formalin?

As a teacher of Materia Medica, I must disapprove of the reference to chloral. This method was to some extent popularised by work done by Dr. Muir in 1900, and he gave ʒi in ʒii of sterile water, and repeated if necessary. It has been extensively used on the Continent and the dosage given by Colin ranged from ʒijss-ʒiii; by Arloing, ʒiii-ʒvi; and by Nocard, gr. 75 per 100lb. body-weight.

Since the intravenous dose is usually reckoned to be one-third of the dose *per os* and the maximum dose *per os* is ʒii, Professor McCunn's dosage seems rather heroic.

He gives ℥iv to a large cart horse intravenously and doses of over ℥iv are regarded as being lethal when given *per os*. Further, I question the wisdom of submitting the delicate endothelial lining of the jugular to a concentration, which, when further diluted, is sufficiently irritant seriously to affect the mucous membrane of the mouth.

Cadiot records a case in which the jugular was entirely obliterated and another in which death occurred where the dosage did not exceed grs. 90 per 100lb. bodyweight.

Dollar sums up the situation by stating "although when performed antiseptically and by skilled operators, intravenous injection may be innocent, it has given such bad results in the hands of the majority that it has been renounced by veterinary surgeons of eminence."

Referring to tetanus, I should like to know whether there is any proof that the use of anti-tetanic serum is of service as a curative agent. If one considers that tetanus is set up by a local infection, and from a centre which acts as a reservoir for the output of exotoxins into the system and into the blood stream, the introduction of anti-serum comes under the heading of rational therapy.

In the idiopathic form of the disease, where no palpable centre exists and where surgical measures cannot be taken, the prognosis ranks from subacute to fatal. Here the tetanus bacilli are left to fulfil their destiny and I should like to know their ultimate fate. In the border-line case which eventually recovers, do the bacilli die and undergo dissolution, or do they still exist in the tissues? Do they become shorn of their powers of giving forth exotoxins, or does the animal organism acquire the power of neutralising these toxins? At what stage in the duration of the disease does such change take place? These questions have a distinct bearing upon the length of time serum treatment should be persisted in.

The fact must not be lost sight of, in ascribing good results to serum treatment, that other methods exist, as, for instance, the subcutaneous injection of phenol solution and of magnesium sulphate solution. In both of these treatments it is said that if abscess formation occurs the prognosis is favourable. Of the former I have little experience, but mag. sulph. in saturated solution produces a marked local reaction followed by the formation of an abscess containing thick, creamy pus in the course of three to five days. The injections are repeated daily over a period of eight to ten days and one will sometimes see equally severe cases recover with this line of treatment as with the administration of serum.

Mag. sulph., when absorbed into the blood stream, acts as a neuro-muscular depressant and has been fairly extensively used in human tetanus both by way of the blood stream and intrathecally.

A point which may be mentioned is that even the most docile horses come to resent the hypodermic needle, and after two to three days, fight against it very much, often inducing serious spasm and threatening to fall. I should like to know how Professor McCunn proceeds when this hypersensitive condition exists?

Personally, I think serum is valuable in treatment, cutting short the danger period, and that if the animal can be kept alive for ten days the chances are very much in his favour. I regard intravenous injection of serum of value as a first administration, but after that I prefer hypodermic methods.

There is little doubt that early cases of laminitis are benefitted by injections of adrenalin along the plantar nerves. We have used this method for a good many years, generally in conjunction with a local anæsthetic.

Probably urea and quinine is the best agent for this purpose, as its effects are more prolonged and it is said to be effective for twenty-four to forty-eight hours. The acute distress of the patient is relieved and in the recent case one may order slow exercise; this, in itself, has been advocated by some authorities as one of the best methods of treatment, as the pumping action set up in the feet by motion tends to relieve the congested capillaries.

Arecoline is also useful and worthy of mention. The method of trimming the feet is interesting, but I have no experience of the process. I should like to know whether the method is efficacious when the edge of the pedal bone protrudes through the sole.

My chief objection to the use of turpentine as a counter-irritant is the excessive amount of pain set up. This would seem to indicate that the method is more drastic than other forms of counter-irritation. The method may, to some extent, replace and cause less permanent blemish than setoning.

I have a great deal of faith in mixed blister, but it does not always effect a cure. Finally, I should like to thank Professor McCunn very much for his paper and I trust we shall both learn much from the discussion.

Captain L. S. BALLS: Professor McCunn stated that human cases of tetanus showing definite clinical symptoms were regarded as incurable. I know a man who had tetanus and who was so stiff that they could pick him up and lay him down like a board, and I can produce him.

Professor G. H. WOOLDRIDGE: In the first instance, I certainly congratulate my colleague on the paper he has given us to-night. I know that the first thing that entered his mind in connection with it was to write something that would create a good discussion, and I do not know whether he will agree with me altogether in saying that I advise some of you not to believe literally everything he has told us in so far as it may not altogether conform with some of his own real views. I should like to know, however, whether he agrees with all the methods he has recommended as used by others; for example, the use of turpentine in hip and shoulder lameness, as a result of which, he pointed out, you were likely to get rather serious abscesses. What occurs to me is that in many instances an owner would be likely to consider the cure worse than the disease.

Going through his paper, I may say that with quite a number of the things to which he has referred I am in close agreement. With regard to the use of formalin in purpura hæmorrhagica, I have not treated many cases with it intravenously, but where I have done so the results have been generally better than where I have not used it.

I have not used chloral intravenously for general anæsthesia in the horse, but I can quite see how its use might be resorted to with great advantage, especially where one is single-handed, although that difficulty can often be overcome by administering chloroform in the standing position. I should not think there is a great danger, in any case, of causing injury to the vein by the injection of chloral or formalin, provided that your injections are sufficiently diluted, that you are sure of your technique and are as careful in your precautions as Professor McCunn has advised. It is most important to get a good stream of blood through the needle both before and after the injection of the agent.

In the case of anti-tetanic serum, I do not see any advantage whatever in the intravenous injection. It is a horse serum, and it is absorbed very rapidly indeed from the loose subcutaneous tissues. The short delay of a minute or two which will elapse in its absorption as compared with the intravenous injection is of no moment. As to its value as a curative agent, it has long been understood that it is of no value, but I have come to the conclusion that that is because the doses given are always too small. It has always been an expensive agent to produce and to purchase, and in dealing with a bad case one has felt that one has not been justified in going to the expense of giving large doses, and so small doses, only useful as a preventive, have been given. It was suggested by Professor Smythe that he did not see that the use of anti-tetanic serum was of much service, but it has been shown that where you have got tetanus well-established you have some organic fusion of the nerve cells with the toxin, and certainly it will not remedy that fixation, but it does neutralise any free toxin, and when the serum is circulating through the area of the wound at the point of infection it does exert a beneficial effect in neutralising the effect of the toxins and may be in destroying them. In connection with tetanus, I think I must disagree with Professor McCunn when he suggests that one could not be

certain of a diagnosis of tetanus unless the organism was discovered. He was satisfied to accept his own diagnosis of laminitis of short duration without the discovery of anything, and laminitis in the early stages is much more likely to be confused with other affections than is an established case of tetanus. But I would remind you that all cases that are diagnosed as tetanus of course are not tetanus—I am thinking of the case cited by Mr. Balls, where it is quite possible that it was a case of tetany and not of the specific disease tetanus. I have had similar cases in the dog, where the impression I got was that the condition was not tetanus but tetany.

Captain BALLS: This case was definitely tetanus; it was a marvellous recovery.

Professor WOOLDRIDGE: That does not alter the case. In my mind, at any rate, there is a very distinct doubt; it may have been some other condition after all, and not tetanus.

With regard to the treatment of laminitis with adrenalin, it is undoubtedly a very good thing, but in that case I think Professor McCunn did not suggest intravenous injection. I do not see why not, except that you have two effects (1) a local effect, and (2) an effect on the general circulation as a cardiac stimulant. The treatment of chopping off the toe in laminitis reminds one of the old method of reducing the congestion by paring out and bleeding through the toe, which was discontinued because of the risks of infection and because in many cases good results did not accrue. There is nothing surprising in the fact that the foot rapidly recovers its normal shape, for the stubbing of the toe does not alter the direction of growth of the new horn.

Concerning the air that may find its way into the jugular vein during the process of intravenous injection—that has worried me, so much so, that I have come to the conclusion that it does not matter one bit. I have attempted to kill horses by simply admitting air without force into the jugular vein and I have never been successful.

Mr. H. J. PARKIN: Professor McCunn referred in his paper to the fact that there was a veterinary surgeon present who had seen the administration of chloral as a general anæsthetic, and I was the gentleman to whom he referred. In his hands it seemed a most simple and effective procedure. He did two horses on the same afternoon, putting both down for neurectomies. He used ʒii in each case, and the animals went down very quickly, remaining down for about two hours.

Mr. B. S. COCKERTON said that he had used formalin for purpura with great success, and was certainly going to continue with it.

Professor JAMES MACQUEEN: I must say that to me this has been a very charming evening. I look upon it as a sort of resurrection of clinical discussion—we have not had a meeting like it for many years. (Applause.) I am very pleased that the essayist avoided any reference to the diseases communicable from animals to man. I think we have reached a stage in our profession when we might concentrate upon our own subjects and leave man severely alone.

Before proceeding further, I should like to congratulate Professor McCunn, and, at the same time, Professor Smythe, on the ability which they have shown in the rôles of essayist and opener of the discussion respectively. I do not think it will come amiss from me, but as they are two recruits from the Royal Veterinary College I think they both deserve our thanks for the excellent work they have done to-night.

With regard to the paper, I do not suppose Professor McCunn expects me to agree with all he has said, and whether he is expecting it or not, I do not agree. (Laughter.) Concerning intravenous medication, intravenous medication is no new thing, but it has never been very popular because of the accidents that may accompany it. Not many years ago, it was the custom to treat all cases of abdominal pain by the intravenous injection of barium chloride and those who read in the *Record* discourses on the efficacy of this method of treatment immediately proceeded to follow suit, with most disastrous results in many instances. Nowadays, intravenous injection with barium chloride is rather the exception than the rule.

With regard to chloral, I admire the power of chloral when administered intravenously and the length of coma which results—it may be convenient to some people to have an animal down for ten or twelve hours, (Laughter), but I do not think its administration by this route is a practice that should be encouraged: both chloral and formaldehyde are caustic and I doubt if you can use either in this manner without running a certain amount of risk.

As to tetanus anti-toxin, we have heard to-night that in certain cases tetanus anti-toxin is an excellent curative agent. It was, I think, Professor Wooldridge who said that it was demonstrated that in the early stages and in sufficient doses it would be an excellent remedy—I don't know whether he went so far as to say that it was an absolute cure. It occurs to me that we have been much in the dark regarding tetanus. Professor McCunn tells us that some authority has been able to distinguish varieties of tetanus bacilli—socialist, communist and so on. (Laughter.) Politically, they seem to belong to the Labour Party, and when a certain class is in operation it is absolutely hopeless to resort to anti-tetanin. My own doubt as to the efficacy of the serum is based on the experimental work done many years ago by Dr. Hewlett, then at King's College, who practised tetanus experimentation. Large quantities of antitoxin were given with the idea of neutralising the activity of the tetanus bacillus. My view of tetanus is that you should not rely on anti-tetanus serum as a curative, but I think, at the same time, that you cannot discharge your obligation to your client unless you take the opportunity of administering it. It may not be a curative—an established curative—but there is just a chance that it may be of some service. My experience of tetanus is this: if you have a case of acute tetanus in the horse there is no remedy—the horse is almost certain to die. If the case is a mild one, developing slowly, you will obtain the same result by leaving the animal severely alone as by injecting serum. I go further and say that it is unnecessary to keep the chronic tetanus case in an isolated, dark, quiet place. The noise which is said to be so destructive of the favourable progress of a tetanus case does very little damage. I know of thirteen cases that were stabled throughout in a loose box situated under a gas engine which was constantly going, and they all recovered.

The injection of adrenalin in laminitis is a very interesting thing. If adrenalin injection at the fetlock always succeeded in arresting the progress of the attack everybody would practise it, but unfortunately, like other remedies, it frequently fails in producing the slightest benefit, and often it produces abscess formation and sloughing, and the wound may take many weeks to heal. When the horse recovers from the laminitis it is still practically an invalid because of the sore produced by the adrenalin.

About the dropped sole and the Arab enthusiast. Professor McCunn said that there was a remedy for that condition. Is there any remedy for dropped sole? Can Professor McCunn raise a dropped sole by cutting off the toe or any other part? However, if such a thing is possible, I have no doubt that Professor McCunn will have ample opportunity of putting the theory into practice—he can get a subject, cut off the toe and see whether the dropped sole will rise; I should be very glad to contribute towards the expenses of the purchase of the subject. (Laughter.) In regard to atrophy and the injection of turpentine, I may say that I do not look upon atrophy of the muscles as a serious condition, and I have not had occasion to treat it; I doubt if it is responsible for any lameness. We know very little about muscular action. If you perform median neurectomy you destroy the nerve supply to the flexors of the fore-arm and foot—how is it that the animal can still use the limb? In cases of so-called shoulder slip, atrophy is a frequent result, but I am not aware that the horse remains lame because of the loss of volume of the shoulder muscles. I have known many cases where the

shoulder was deformed in the muscular region and the horse continued at work. My experience of turpentine has been in the treatment of other conditions than atrophy. I consider that the irritation produced by the injection of turpentine is sufficient to prohibit its use; the horse becomes unmanageable in many cases; it is an exceedingly dangerous agent.

Concerning air in the vein, Professor Wooldridge, before he sat down, said that he had never seen any ill effects from air entering the vein and that there was no risk attending the entrance of air into the jugular. He conveyed the impression—at least, to me—that you could not kill a horse by insufflation of the jugular. I will undertake by insufflation to kill any horse he likes to produce. Of course, you must have good lungs, but you can blow a horse over in that way—I have done it and I have seen it done. But that is a different thing from the admission of air accidentally. I agree with him that the accidental admission of some air is of no consequence; to do harm it must be introduced under pressure, when bubbles will be produced which are too large to pass through the capillaries. That is one of the causes of the unfortunate results that are sometimes produced.

I look upon Professor McCunn's essay as not only interesting—one might describe it as amusing—but it is decidedly instructive and on that ground I hail Professor McCunn as a distinct acquisition to the membership of this Society. (Applause.)

Mr. W. PERRYMAN described the essay as one of the most heroic to which they had listened for some time. Professor McCunn had taken up an attitude such as he himself thought he might have done thirty years ago, but he had no doubt that thirty years hence the essayist would be much more moderate in his processes of treatment. While I admire the attitude Professor McCunn has adopted, continued Mr. Perryman, as a practitioner of some years' standing, I do not think I shall take up treatment by means of intravenous injection. It is all very well for those who, in the shelter of their colleges and laboratories can practise it under the best hygienic conditions with plenty of assistance, and where they will have no reflection cast upon them by any client should anything go wrong, but the general practitioner has so many things with which to contend that it might not be advisable for him to take it up.

I think, in intravenous medication, that there is always a great danger of injuring the vein and causing the formation of abscesses and swelling in the surrounding tissues, especially in the case of purpura. I very much doubt whether more than one injection can be given on either side of the neck without a great deal of subsequent swelling.

As to adrenalin, I use a lot of it now in various ways, but when given under the skin I find that it invariably produces an unpleasant necrotic abscess, and for that reason I very much doubt that in many cases it is of much value in laminitis. Two other speakers referred to turpentine. I can picture the animal having such an injection, also the scattering of the forces within a few minutes. My experience is that when an animal has had an irritant, or even a knife, in him once or twice he is very chary of it. I think it is useless in atrophy, as no amount of injection will restore muscle if it is absolutely wasted. It is not a reasonable thing to produce an abscess when one has to give satisfaction to clients in regard to one's method of procedure, leaving out of account the fact that it is a very doubtful method of attempting to achieve recovery. As Professor Macqueen has said, it is remarkable to what a degree atrophy can take place and yet the horse remain at work.

It is most refreshing to have a paper dealing with equine questions, which many of us have so much missed of late.

Mr. H. D. JONES thanked Professor McCunn for his "very progressive paper" and continued: I congratulate him on the fact that he does not get any deaths. My experience of purpura is that it occurs in horses after a severe illness, and my cases of purpura that have succumbed have generally shown a gangrenous lung, or gangrenous intestine. In the injection of formalin I should like to know what happens to the affected lung, does it clean it all up? A good many cases of purpura that recover are no use when you have cured them.

Mr. J. F. MACDONALD: I should like to join in the general chorus of applause to Professor McCunn. As Hon. Secretary, I have been after him for a paper for about three years, and I think the result has justified the effort. I quite agree with Professor Macqueen that we should have more clinical discussions, but the great difficulty is to get clinicians to read papers.

With regard to intravenous injection, I must say that I think its danger is greatly exaggerated. I had at one time a good deal of experience of barium chloride injection given intravenously, and I also saw many injections made by people who had no idea of asepsis, bubbles, or anything else—the man with whom I worked would take an ordinary hypodermic syringe, quite unsterilised and fitted with a rusty needle, and the only precaution he took was to see that the needle really did get into the vein—yet I never saw any bad results. One does not, of course, advise these methods. Often, quite a quantity of air was also injected. He also told me that he had tried to destroy horses by injecting air, but had failed miserably.

With reference to that bar shoe mentioned by Professor McCunn, knocking off the toe-clip and turning the shoe round sometimes makes a sound, serviceable shoe, especially when you want to get at the foot for dressing. This type of shoe is often referred to as a Dick Turpin shoe. On the question of muscular atrophy, does not Professor McCunn think that that is often due to disease in some other part of the limb altogether—not necessarily in the shoulder where the atrophy takes place?

Captain R. J. STOW, remarking that the essayist said that he gave 18,000 to 40,000 units of anti-tenus serum, asked if he gave that in one dose or if not, how many doses did he make of it and at what intervals were they administered.

THE REPLY.

Professor MCCUNN: I thank you all for the very kind way in which you have received, I might say, our joint paper—for Professor Smythe is as much incriminated in this as I am, but, fortunately for him, I have got to answer the questions. (Laughter.)

Professor Smythe's first question was how much air could be permitted to enter the jugular vein with safety in the course of intravenous injection. Professor Wooldridge says that you can let in a fair amount; Professor Macqueen says you can kill a horse that way. I should like to ask Professor Macqueen how it was that on Tuesday I pumped air into a dissecting room pony that was to be slaughtered and it revived him? Professor Smythe asks, "What explanation has Professor McCunn to offer regarding the action of formalin in purpura?" The answer to that is what we used to say in the hospital, "G.O.K." (Laughter.)

"Is it lethal to a causal organism?—etc." The answer is the same. "Is there any proof that the use of anti-tetanic serum is of service as a curative agent?"—He cannot have read the paper. (Laughter). The answer to the question as to whether in border-line cases the bacilli die and undergo dissolution or still exist in the tissues is the same as that given to No. 2 and I will prescribe "the answer as before" to his questions as to whether they become shorn of their powers of giving forth exotoxins or whether the animal organism acquires the power of neutralising those toxins, and as to the stage in the duration of the disease at which such change takes place.

As to hypersensitiveness, if you start when you first see the case, by giving a big dose of anti-tetanus serum, you do not get any hypersensitive condition of the skin. The first time of putting an intravenous injection into a horse with tetanus is the worst—the remaining injections are generally easy. I am sure I could not tell Professor Macqueen if the method is efficacious when the edge of the pedal bone protrudes through the sole—I have never seen a case like that. I know they happen, and you had better ask that question of Professor Macqueen. Answering Mr. Balls, though it is a fact that when definite symptoms of tetanus are shown in man he dies, I qualified that by saying,

"as a general rule" and that is a fact. (Laughter.) From his description of the man who was stiff, I should think that he had probably drunk some starch, or something akin to that substance. (Laughter.)

Professor Wooldridge had some queries about the turpentine. He mentioned my reference to the formation of abscesses, but I was careful to say that when you opened them a creamy fluid came from them, resembling pus. I have seen this procedure recommended in such cases as neuritis in the horse, and the fluid contained in these swellings is supposed to be some sterile material similar to that which is seen in cases of chylous ascites. Some question was raised as to whether the animals were sound afterwards. In my experience, they have been. I can remember one or two cases in which we tried all sorts of things. Only a year ago we had a case in which no less than three veterinary surgeons, including myself, diagnosed the original trouble as a fracture of the acromion process and the horse was very lame. The bone lesion eventually recovered, but he was left with atrophy of the muscles of the shoulder. He was going to be killed, owing to chronic lameness, but I gave him 5 c.c. of turpentine in a ring around the shoulder. A big lump came up and we got away a great deal of the creamy substance to which I have referred, the muscles filled up afterwards, and the animal became sound.

Professor Wooldridge said that by using chloroform for general anæsthesia one would be relieved of a good deal of anxiety if one adopted the practice of administering it single-handed. I think it would be a good thing if we had a meeting at which Professor Wooldridge chloroformed a horse, secured it and performed the operation single-handed. He says that anti-tenus serum is absorbed just as easily from the subcutaneous tissues as by the intravenous method, remaining there only for a minute or two. Any serum I have given by the subcutaneous route has remained there longer than that. How much does he give?

Professor WOOLDRIDGE: I have used it in doses of 20,000 units. The point is not so much the actual rapidity of absorption, but that even if it is a little delayed, it does not matter much, while it is much more simple than intravenous injection.

Professor MCCUNN: Concerning the clinical diagnosis of tetanus, it is much better to confirm this by finding the bacillus if you can. As to the dramatic cases of laminitis —my cases were certainly, in my opinion, laminitis. I did not suggest the intravenous injection of adrenalin because I have not tried it, but I do not see why it should not act that way as well as by any other method. Professor Wooldridge misunderstood me in regard to chopping off the toe and bleeding. My remedy was for resultant defects of laminitis, not for the acute stage, when bleeding is useful.

Professor Macqueen started off by saying that I should not expect him to agree with me. I did not and do not think anybody else did. (Laughter.) He also said that intravenous injection is not a new thing. I may say that I never claimed it as being new. Although I never used barium chloride myself, I knew that it was commonly employed in this manner. I believe it is due to the maladministration of barium chloride and its attendant consequences that we of the younger generation who have sat at the feet of Professors Macqueen and Wooldridge have such a dread of all things intravenous. He condemns chloral because the horse is down ten to twelve hours. I explained that case; it was a case in which I wanted to amputate the penis of a horse and, it being in my brother's practice, I had to persuade him that it was a safe thing. Having secured a horse that didn't matter—(laughter)—I gave him a big enough dose for my brother to see that it was more or less immaterial how much you gave the animal. I believe the horse had ℥iv, but in the ordinary case one would give nothing like that amount and the horse would not be down for anything like so long as twelve hours.

"Is tetanus anti-toxin curative?"—that is a very great question. I sometimes think it has been, but one cannot get away from the fact that probably a number of my tetanus cases were caused by bacilli of very low virulence and I doubt its curative properties in infection by bacilli of high virulence. The existence of varieties of tetanus bacilli is proved: Professor Macqueen can turn it up in the *Journal of Experimental Pathology and Bacteriology* of three years ago, and he will see photos of the culture tubes in which cultures were grown; also in regard to the soils used, and he will find that a number of the tetanus bacilli were non-pathogenic. Tetanus bacilli are found in 100 per cent. of soils and 50 per cent. of the bacilli found therein will be pathogenic and 50 per cent. non-pathogenic. Professor Macqueen says that cases which develop slowly will get better if you leave them severely alone; I, too, think that they will, but what does he mean by "developing slowly?"—a week, a fortnight, or a month? I fully agree with him as to the importance of noise, darkness, etc., being overestimated. All the elaborate precautions which used to be taken are unnecessary. As regards adrenalin, I am afraid I have had no experience of its injection being followed by abscess formation and sloughing: I may be lucky, for I have heard that it happens. If it is a common occurrence, however, why is it that dentists do not experience a great deal of trouble with abscesses and sloughing seeing that most of their local anæsthetics contain adrenalin? Concerning the remedy for dropped sole as applied by "the enthusiastic Arab," I have never done it myself in such a bad case as that, but I have witnessed the improvement resulting from its performance and I could show you now a horse shod with a modified Blenkinsop shoe, and that sole has gone up. You would never think that she had had laminitis, yet she was so bad that the whole of the old hoof was taken away. "Is atrophy serious?" It is a matter of opinion whether a horse is lame from muscular atrophy or from something else. In my opinion, muscular atrophy may cause true mechanical lameness.

Professor Macqueen suggests that the irritation caused by turpentine is sufficient to prohibit its use in such cases, but he forgets that I did not inject ounces of it in one spot—I used a 5 c.c. Record syringe and spread the injections over various points. I fail to see how it is any more barbarous than firing and blistering: I frequently see Professor Macqueen firing and blistering and it makes me shudder every time I go by. (Laughter.)

In answer to Mr. Perryman, as regards the injection of chloral, I have only had one go wrong out of about 50 and that one had poll evil coincident with the formation of the abscess, but it got better. I have never seen any ill effects from the intravenous injection of formalin in purpura, but I have only had a limited number of cases. I have never experienced the formation of abscesses after the injection of adrenalin. Mr. Perryman also asked about atrophy, which, as I have said, is a debatable question. If the horse is mechanically lame and has much muscle wastage, sometimes you think that may be due to atrophy. In such cases I have injected turpentine and for some reason or other they have got right, but possibly it may be that the turps has acted on something else.

In answer to Mr. Jones, the object of intravenous therapy is to *avoid a post-mortem*. (Laughter.) "What happens to the gangrenous lung?" If you give horses with purpura formaldehyde they never get gangrene of the lungs and if they have it before it must resolve under the treatment.

In reply to Mr. Stow, I do give a big dose of anti-tetanus serum—generally six bottles, each containing 3,000 units—and you can repeat next day if you like.

PERSONAL.

Appointment. Mr. J. S. Adamson, B.Sc. (Vet. Sci.), M.R.C.V.S., of Wemyss Castle, a graduate of the Royal (Dick) Veterinary College, Edinburgh, has been appointed Goverment Veterinary Officer, Southern Rhodesia.

Annual Congress. Readers are asked to note the following amendments to the list of recommended hotels in Torquay published in last week's *Record*. The terms at the Torbay Hotel are *from* 6 guineas a week, and the terms reference concerning the Grand Hotel should read: "Terms obtainable on application."

Eradication of Bovine Tuberculosis.

By HENRY GRAY, M.R.C.V.S., Kensington.

The agricultural community has become alarmed at the attempt made by a certain section of it to obtain power to introduce from Canada tubercle-free cows and heifers to replenish herds depreciated by tubercle. It resents most categorically the statement made by the tubercle-free reformers that the dairy herds of this country were, to the extent of 50 per cent., saturated with the disease. Probably it would not be correct to say that all herds are infected to this extent. But it was found during the great outbreak of foot-and-mouth disease that the incontacts in some dairies were so badly invaded with tubercle that quite 50 per cent. of the carcases were unfit for human food. Such herds had been supplying their localities with milk.

Eminent veterinarians of undisputed authority compute that 33 or probably 40 per cent. of adult cattle in these islands are infected; really, therefore, there is not much difference of opinion between the experts and the tubercle-free herd reformers as to the degree of incidence. If this estimate is correct, if follows that as some herds are more or less free of the disease, others must be infected to the extent of 50, 60 or 70, or even as high as 100 per cent.

In 1865, Villemin proved that tubercle was inoculable and transmissible from man to various animals. Gerlach, in 1866, showed that the disease could be given to cattle by the ingestion of tubercles from the serosa and of milk of affected cows. Chauveau, in 1868, demonstrated that it was conveyed from man to heifers by ingestion.

Robert Koch, in 1882, discovered the causal bacillus which, he said, was identical in all species. In 1891 Paul Guttmann, of Dorpat, showed that tuberculin was of great diagnostic value for the purposes of prophylaxis. Since Koch's great discovery much research has been undertaken and in spite of it all no unanimous opinion has been arrived at as to the dangers or harmlessness of bovine tuberculosis to man. A large and perhaps a better informed section of the medical profession at home as well as abroad is convinced that it is a serious menace to public health, whilst another section believes it to be more beneficial than otherwise, some even going to the extent of maintaining that if bovine tuberculosis were eliminated the human type, especially pulmonary phthisis, would become more rampant than it is to-day. It is asserted on good authority that every year at least 30,000 children and young people succumb to tuberculosis contracted from ingestion of tuberculous milk, while a very much larger number are rendered more or less invalids or cripples for the remainder of their lives.

Many of the forms of tuberculosis seen in human beings in this country are not encountered in those districts in India, Australia and other places where bovine tuberculosis does not exist. Let me quote here statistics received on May 11th from the distinguished State M.O.H. for Guernsey, Dr. H. Draper Bishop.

Human and Bovine Statistics, Guernsey.

	Ten Years, 1910-1919.	Years, 1924, 5 & 6.
Cattle, tuberculin tested ...	2,426 (Not the total, but official testing only.)	2,882 (Total).
Cattle, tuberculin tested, number reacting and notified according to Law ...	191	2
Human Tuberculosis.		
Total deaths...	478	123
Phthisis	357	103
Other tuberculars*	121	20
Deaths under five years of age	41	2
Percentage to the total number of deaths from tuberculosis	8·5	1·7

* Forty-seven of these were registered as being due to "tuberculosis," and are therefore included in this total.

The average population for 1910-1919 was 40,833, and from 1924-5-6, 38,650. In 1926 the number of cows in milk and in calf was 2,590.

Dr. Stanley Griffith's statistics as to the incidence of the bovine type of the disease in man have become classical.

The cost to the State for treatment advances annually. In 1924 it was £2,884,062; in 1925, £3,034,600, and in 1926, £3,157,879. These figures do not include capital expenditure. To this cost should be added the huge sum that is spent privately and the amount of services lost to the community by those thrown out of work by the disease. Then there is the cost to the State for the elimination of the palpably-bad clinical cases in cattle. From the time the Tuberculosis Order, 1925, came into force on September 1st of that year to December 11th, 1926, £90,184 was paid out as compensation for the destruction of such cattle. If one takes into consideration the amount spent on State treatment, the cost to private individual treatment, the loss of services, temporary or permanent, entailed by this disease, the diminution of milk and meat supply, the wastage of food, the cost of the so-called clean milk plant, and other things involved, one cannot say that it is an exaggeration to put the total annual loss to this country at £20,000,000.

It has been stated by a very eminent authority that if we were to adopt the radical method for freeing this country of bovine tuberculosis it would create a milk famine. The authorities in Guernsey, where the cattle are highly prized, did not find this so, nor do the U.S.A. authorities (with their 61,557,079 head of cattle) who have from 1922 to 1926 reduced the incidence of the disease from 4 to 2·8 per cent., anticipate such a famine. This latter percentage will no doubt progressively decrease as the number of cattle to be tested and freed decreases.

But milk is not a natural or necessary diet for children weaned from the breast and certainly not for adults. It may be forgotten that numerous children never receive any milk from the time of their birth and yet they are reared healthily. It is still less so a natural or even a good food for adults. In general, people who are addicted to milk drinking show less vigour and lack that bloom shown by those people who enjoy a good thick underdone steak. If milk is to have its full value, it should be consumed as it comes direct from the cow. Pasteurisation and all other methods of treating it from the time it comes from the cow until it is consumed, depreciate its nutritive value. When coming from diseased cows, and especially those infected with tubercle, it is one of the most dangerous of foods for man, pig, cat, rabbit and any other animal. It is all very well to say that people thrive on it, but if it infects them how can they be healthy? There is not only the danger of milk, but also of cheese and butter, in which the tubercle germ may live for many months. One should not judge by external appearances either of a man or a beast. Numerous strong-looking or robust men, such as athletes, and also cattle, succumb to this fell disease.

Cattle in those parts where bovine tuberculosis does not exist, or is not allowed to exist, are not insusceptible if they are brought in contact with the infection. According to Dr. Bishop, cattle returning from a dairy show held some twenty-eight years ago introduced into Guernsey tuberculosis which they had contracted at the show. The disease was stamped out by drastic measures. No live cattle, save those from Alderney and Sark, are allowed into the island of Guernsey.

In order to protect the human race against the dangers of bovine tuberculosis, nothing short of testing all the cattle of these islands and slaughtering the reactors and the prohibition of the introduction of animal products containing tubercle bacilli from overseas will be of permanent value. The disease must at the same time be eradicated from piggeries, poultry yards, rabbitries and other places. Probably when the disease is stamped out in cattle it will disappear in other live stock. Contrary to the opinion of most authorities, generalised tuberculosis is very frequent in the rabbit; it is no doubt contracted by the modern custom of the owners giving their animals cow's milk which happens to contain tubercle bacilli.

Numerous will be the objections to this as to any other radical measure—such as the eradication of glanders, the elimination of yellow fever from the Panama region, foot-and-mouth disease and other plagues.

But putting aside public health considerations, is it not up to the agriculturist to get rid of this disease in his cattle and thus remove the reproach cast upon our cattle by all countries that have imported them with the object of improving their herds? It was formerly termed: "The English Disease," which we have spread by our infected herds to every country where they have gone.

It is useless to tinker with this disease; everything that has been done in the past thirty or forty years to cope with it has been labour in vain. The Tuberculosis Order, 1925, has been a sheer waste of money. During the week ending March 5th, out of the samples taken of milk arriving in London, 61 per cent. contained tubercle bacilli, and at any rate the incidence of tubercle bacilli in milk has increased instead of being diminished by that Order coming into force. What has our profession to say to it? Keeping a herd free of the disease for a great number of years and then getting it re-infected will not be evidence, not to speak of proof, against the compulsory slaughtering policy. The public look to the veterinary profession for guidance. It is useless to wait until the medical profession has made up its mind regarding the danger of bovine tuberculosis. That does not immediately concern our profession. Our province, as the first line of defence in public health, is to exterminate this disease in the most expeditious manner. Guernsey, on a small scale, has shown us how to set to work. The U.S.A. is doing it on a gigantic scale. Their difficulties were, or are, as great, if not greater, in proportion. In the U.S.A. an extensive propaganda was instituted by the Department of Agriculture, not only through the medium of the lay press or by literature, but also by poster. This was and is being done to educate the public as to the importance of the task. Some of these posters are very attractive and instructive and show at a glance the distribution, symptoms, statistics, etc., of the disease. Separate posters are used for cattle, pigs and poultry. Here we should require one each, not only for these species but also for the dog, cat, rabbit and parrot.

What Guernsey did and the U.S.A. are doing we should be able to do. The profession must first instruct itself, organise and advise for the good of the public. Tuberculosis is a preventible disease and should be prevented, not tinkered with. Sir Kingsley Wood, Parliamentary Secretary of the Ministry of Health, speaking at a luncheon given by the Milk Recording Societies in London, on May 12th, said: "The origin of a great many diseases, especially tuberculosis in children, could be traced to 'bad and filthy milk.'"

This, emanating from the Ministry of Health, should be a hint to the profession as to the trend of coming events. The *laissez faire* attitude so persistently maintained by the rank and file of the profession concerning this disease will no longer be tolerated by those who are responsible for the health of the community. Action in this direction is bound to take place in the near future, and those who have remained "the hewers of wood and drawers of water" will find their craft superseded by more up-to-date methods and requirements.

It would be much wiser if, instead of constantly boasting of our superior virtues and expecting others to see us as we see ourselves, we were to follow Shakespeare where he says:—

> "Polonius, my friend,
> If we do not get the reward,
> We will do more—
> We will deserve it."

[As our readers will realise, the fact that a statement has been made that a certain percentage of British cows react to the tuberculin test must not be taken as indicating that they are all giving tuberculous milk, or are in any way a danger to the public, as it is invariably the case that only where the udder is affected does the cow give tubercle-bacilli in the milk.—Ed.]

Scientific Slaughtering.

By C. W. HUME.

(Reprinted from NATURE, April 2nd, 1927.)

The problem of the humane slaughtering of animals for food is one which has exercised many members of the medical and veterinary professions. It is of direct concern to men of science, first because certain relevant facts which are in dispute can only be settled by rigorously scientific experiment, and secondly, because the ethical principles involved have received a much enhanced significance from the work of Darwin and other zoologists. The discussion recently opened at King's College, London, by Profs. McCunn and Smythe, of the Royal Veterinary College, under the chairmanship of Prof. Julian Huxley, affords an occasion for putting before the readers of NATURE the more important of the facts relating to the slaughterhouse.

In all matters which involve a conflict between ethical principles and economic interests the relevant facts are apt to become entangled in a good deal of special pleading, and in the present case there are certain points upon which even scientific authorities are not in agreement; but although the necessity for further inquiry of a rigorously scientific character is generally recognised, a number of important facts may be regarded as definitely established. The most recent authoritative documents for these are the reports issued by the London County Council on Feb. 15, 1923, and by the Public Health Department of the Corporation of London on April 2, 1925. Considerable importance attaches also to a paper read by Prof. G. H. Wooldridge before a meeting of the National Veterinary Medical Association and published, together with the discussion which followed it, in the *Veterinary Record* of Mar. 4, 1922; and to a report on the Jewish method of slaughtering by Prof. E. H. Starling and Sir Michael Foster, published by the Admiralty in 1904. The views of the meat traders were defended by Prof. Leonard Hill in the *Lancet* of Dec. 22, 1923, but the results of the demonstration arranged by them at Birmingham in Nov., 1923, should be accepted with considerable reserve, so far, at all events, as the question of bleeding is concerned, since (according to Dr. W. J. Howarth, Medical Officer of Health to the Corporation of London) animals were "left on the floor for different intervals before the blood was allowed to be extracted." This incident emphasises the necessity for ensuring that such trials be controlled in every detail (including, by the way, the selection of the animals) by men trained in the rigour of scientific method.

The old-fashioned methods of slaughtering which are employed in the case of about fourteen million animals yearly in Great Britain are broadly as follows: Large animals before being killed are stunned with a pole-axe; pigs are hoisted with a chain attached to one hind leg and stuck, commonly without previous stunning; many calves and some pigs are first stunned with a hammer; occasionally sheep and lambs are similarly stunned, but usually they are lifted on to a 'crutch' or trestle and stuck with a knife while conscious, after which their necks are broken by pressing back the head, the spinal cord being sometimes cut with the knife; Jewish slaughterers, for reasons of ritual, first throw the animal and then cut its throat in every case. The modern method, which is at present used for about one million animals yearly in Great Britain, consists in preliminary stunning with a specially designed pistol, after which the animal must be immediately bled.

From the humane point of view the superiority of the pistol over the pole-axe has been placed beyond serious question by the experiments conducted on behalf of the Corporation of London by the Medical Officer of Health (Dr. W. J. Howarth), the Superintendent of the Metropolitan Cattle Market (Mr. J. R. Hayhurst), and the Veterinary Surgeon at the Central Meat Market (Lieut.-Col. T. Dunlop Young). These officers found, in a number of trials with careful and experienced slaughtermen, that it took on the average 2·49 blows with the pole-axe to stun a bull, 1·23 blows to stun a steer, 1·27 to stun a cow

Eradication of Bovine Tuberculosis.

By HENRY GRAY, M.R.C.V.S., Kensington.

The agricultural community has become alarmed at the attempt made by a certain section of it to obtain power to introduce from Canada tubercle-free cows and heifers to replenish herds depreciated by tubercle. It resents most categorically the statement made by the tubercle-free reformers that the dairy herds of this country were, to the extent of 50 per cent., saturated with the disease. Probably it would not be correct to say that all herds are infected to this extent. But it was found during the great outbreak of foot-and-mouth disease that the incontacts in some dairies were so badly invaded with tubercle that quite 50 per cent. of the carcases were unfit for human food. Such herds had been supplying their localities with milk.

Eminent veterinarians of undisputed authority compute that 33 or probably 40 per cent. of adult cattle in these islands are infected; really, therefore, there is not much difference of opinion between the experts and the tubercle-free herd reformers as to the degree of incidence. If this estimate is correct, if follows that as some herds are more or less free of the disease, others must be infected to the extent of 50, 60 or 70, or even as high as 100 per cent.

In 1865, Villemin proved that tubercle was inoculable and transmissible from man to various animals. Gerlach, in 1866, showed that the disease could be given to cattle by the ingestion of tubercles from the serosa and of milk of affected cows. Chauveau, in 1868, demonstrated that it was conveyed from man to heifers by ingestion.

Robert Koch, in 1882, discovered the causal bacillus which, he said, was identical in all species. In 1891 Paul Guttmann, of Dorpat, showed that tuberculin was of great diagnostic value for the purposes of prophylaxis. Since Koch's great discovery much research has been undertaken and in spite of it all no unanimous opinion has been arrived at as to the dangers or harmlessness of bovine tuberculosis to man. A large and perhaps a better informed section of the medical profession at home as well as abroad is convinced that it is a serious menace to public health, whilst another section believes it to be more beneficial than otherwise, some even going to the extent of maintaining that if bovine tuberculosis were eliminated the human type, especially pulmonary phthisis, would become more rampant than it is to-day. It is asserted on good authority that every year at least 30,000 children and young people succumb to tuberculosis contracted from ingestion of tuberculous milk, while a very much larger number are rendered more or less invalids or cripples for the remainder of their lives.

Many of the forms of tuberculosis seen in human beings in this country are not encountered in those districts in India, Australia and other places where bovine tuberculosis does not exist. Let me quote here statistics received on May 11th from the distinguished State M.O.H. for Guernsey, Dr. H. Draper Bishop.

Human and Bovine Statistics, Guernsey.

	Ten Years, 1910-1919.	Years, 1924, 5 & 6.
Cattle, tuberculin tested ...	2,426 (Not the total, but official testing only.)	2,882 (Total).
Cattle, tuberculin tested, number reacting and notified according to Law ...	191	2
Human Tuberculosis.		
Total deaths...	478	123
Phthisis	357	103
Other tuberculars*	121	20
Deaths under five years of age	41	2
Percentage to the total number of deaths from tuberculosis	8·5	1·7

* Forty-seven of these were registered as being due to "tuberculosis," and are therefore included in this total.

The average population for 1910-1919 was 40,833, and from 1924-5-6, 38,650. In 1926 the number of cows in milk and in calf was 2,590.

Dr. Stanley Griffith's statistics as to the incidence of the bovine type of the disease in man have become classical.

The cost to the State for treatment advances annually. In 1924 it was £2,884,062; in 1925, £3,034,600, and in 1926, £3,157,879. These figures do not include capital expenditure. To this cost should be added the huge sum that is spent privately and the amount of services lost to the community by those thrown out of work by the disease. Then there is the cost to the State for the elimination of the palpably-bad clinical cases in cattle. From the time the Tuberculosis Order, 1925, came into force on September 1st of that year to December 11th, 1926, £90,184 was paid out as compensation for the destruction of such cattle. If one takes into consideration the amount spent on State treatment, the cost to private individual treatment, the loss of services, temporary or permanent, entailed by this disease, the diminution of milk and meat supply, the wastage of food, the cost of the so-called clean milk plant, and other things involved, one cannot say that it is an exaggeration to put the total annual loss to this country at £20,000,000.

It has been stated by a very eminent authority that if we were to adopt the radical method for freeing this country of bovine tuberculosis it would create a milk famine. The authorities in Guernsey, where the cattle are highly prized, did not find this so, nor do the U.S.A. authorities (with their 61,557,079 head of cattle) who have from 1922 to 1926 reduced the incidence of the disease from 4 to 2·8 per cent., anticipate such a famine. This latter percentage will no doubt progressively decrease as the number of cattle to be tested and freed decreases.

But milk is not a natural or necessary diet for children weaned from the breast and certainly not for adults. It may be forgotten that numerous children never receive any milk from the time of their birth and yet they are reared healthily. It is still less so a natural or even a good food for adults. In general, people who are addicted to milk drinking show less vigour and lack that bloom shown by those people who enjoy a good thick underdone steak. If milk is to have its full value, it should be consumed as it comes direct from the cow. Pasteurisation and all other methods of treating it from the time it comes from the cow until it is consumed, depreciate its nutritive value. When coming from diseased cows, and especially those infected with tubercle, it is one of the most dangerous of foods for man, pig, cat, rabbit and any other animal. It is all very well to say that people thrive on it, but if it infects them how can they be healthy? There is not only the danger of milk, but also of cheese and butter, in which the tubercle germ may live for many months. One should not judge by external appearances either of a man or a beast. Numerous strong-looking or robust men, such as athletes, and also cattle, succumb to this fell disease.

Cattle in those parts where bovine tuberculosis does not exist, or is not allowed to exist, are not insusceptible if they are brought in contact with the infection. According to Dr. Bishop, cattle returning from a dairy show held some twenty-eight years ago introduced into Guernsey tuberculosis which they had contracted at the show. The disease was stamped out by drastic measures. No live cattle, save those from Alderney and Sark, are allowed into the island of Guernsey.

In order to protect the human race against the dangers of bovine tuberculosis, nothing short of testing all the cattle of these islands and slaughtering the reactors and the prohibition of the introduction of animal products containing tubercle bacilli from overseas will be of permanent value. The disease must at the same time be eradicated from piggeries, poultry yards, rabbitries and other places. Probably when the disease is stamped out in cattle it will disappear in other live stock. Contrary to the opinion of most authorities, generalised tuberculosis is very frequent in the rabbit; it is no doubt contracted by the modern custom of the owners giving their animals cow's milk which happens to contain tubercle bacilli.

Numerous will be the objections to this as to any other radical measure—such as the eradication of glanders, the elimination of yellow fever from the Panama region, foot-and-mouth disease and other plagues.

But putting aside public health considerations, is it not up to the agriculturist to get rid of this disease in his cattle and thus remove the reproach cast upon our cattle by all countries that have imported them with the object of improving their herds? It was formerly termed: "The English Disease," which we have spread by our infected herds to every country where they have gone.

It is useless to tinker with this disease; everything that has been done in the past thirty or forty years to cope with it has been labour in vain. The Tuberculosis Order, 1925, has been a sheer waste of money. During the week ending March 5th, out of the samples taken of milk arriving in London, 61 per cent. contained tubercle bacilli, and at any rate the incidence of tubercle bacilli in milk has increased instead of being diminished by that Order coming into force. What has our profession to say to it? Keeping a herd free of the disease for a great number of years and then getting it re-infected will not be evidence, not to speak of proof, against the compulsory slaughtering policy. The public look to the veterinary profession for guidance. It is useless to wait until the medical profession has made up its mind regarding the danger of bovine tuberculosis. That does not immediately concern our profession. Our province, as the first line of defence in public health, is to exterminate this disease in the most expeditious manner. Guernsey, on a small scale, has shown us how to set to work. The U.S.A. is doing it on a gigantic scale. Their difficulties were, or are, as great, if not greater, in proportion. In the U.S.A. an extensive propaganda was instituted by the Department of Agriculture, not only through the medium of the lay press or by literature, but also by poster. This was and is being done to educate the public as to the importance of the task. Some of these posters are very attractive and instructive and show at a glance the distribution, symptoms, statistics, etc., of the disease. Separate posters are used for cattle, pigs and poultry. Here we should require one each, not only for these species but also for the dog, cat, rabbit and parrot.

What Guernsey did and the U.S.A. are doing we should be able to do. The profession must first instruct itself, organise and advise for the good of the public. Tuberculosis is a preventible disease and should be prevented, not tinkered with. Sir Kingsley Wood, Parliamentary Secretary of the Ministry of Health, speaking at a luncheon given by the Milk Recording Societies in London, on May 12th, said: "The origin of a great many diseases, especially tuberculosis in children, could be traced to 'bad and filthy milk.'"

This, emanating from the Ministry of Health, should be a hint to the profession as to the trend of coming events. The *laissez faire* attitude so persistently maintained by the rank and file of the profession concerning this disease will no longer be tolerated by those who are responsible for the health of the community. Action in this direction is bound to take place in the near future, and those who have remained "the hewers of wood and drawers of water" will find their craft superseded by more up-to-date methods and requirements.

It would be much wiser if, instead of constantly boasting of our superior virtues and expecting others to see us as we see ourselves, we were to follow Shakespeare where he says:—

> "Polonius, my friend,
> If we do not get the reward,
> We will do more—
> We will deserve it."

[As our readers will realise, the fact that a statement has been made that a certain percentage of British cows react to the tuberculin test must not be taken as indicating that they are all giving tuberculous milk, or are in any way a danger to the public, as it is invariably the case that only where the udder is affected does the cow give tubercle-bacilli in the milk.—Ed.]

Scientific Slaughtering.

By C. W. HUME.

(Reprinted from NATURE, April 2nd, 1927.)

The problem of the humane slaughtering of animals for food is one which has exercised many members of the medical and veterinary professions. It is of direct concern to men of science, first because certain relevant facts which are in dispute can only be settled by rigorously scientific experiment, and secondly, because the ethical principles involved have received a much enhanced significance from the work of Darwin and other zoologists. The discussion recently opened at King's College, London, by Profs. McCunn and Smythe, of the Royal Veterinary College, under the chairmanship of Prof. Julian Huxley, affords an occasion for putting before the readers of NATURE the more important of the facts relating to the slaughterhouse.

In all matters which involve a conflict between ethical principles and economic interests the relevant facts are apt to become entangled in a good deal of special pleading, and in the present case there are certain points upon which even scientific authorities are not in agreement; but although the necessity for further inquiry of a rigorously scientific character is generally recognised, a number of important facts may be regarded as definitely established. The most recent authoritative documents for these are the reports issued by the London County Council on Feb. 15, 1923, and by the Public Health Department of the Corporation of London on April 2, 1925. Considerable importance attaches also to a paper read by Prof. G. H. Wooldridge before a meeting of the National Veterinary Medical Association and published, together with the discussion which followed it, in the *Veterinary Record* of Mar. 4, 1922; and to a report on the Jewish method of slaughtering by Prof. E. H. Starling and Sir Michael Foster, published by the Admiralty in 1904. The views of the meat traders were defended by Prof. Leonard Hill in the *Lancet* of Dec. 22, 1923, but the results of the demonstration arranged by them at Birmingham in Nov., 1923, should be accepted with considerable reserve, so far, at all events, as the question of bleeding is concerned, since (according to Dr. W. J. Howarth, Medical Officer of Health to the Corporation of London) animals were "left on the floor for different intervals before the blood was allowed to be extracted." This incident emphasises the necessity for ensuring that such trials be controlled in every detail (including, by the way, the selection of the animals) by men trained in the rigour of scientific method.

The old-fashioned methods of slaughtering which are employed in the case of about fourteen million animals yearly in Great Britain are broadly as follows: Large animals before being killed are stunned with a pole-axe; pigs are hoisted with a chain attached to one hind leg and stuck, commonly without previous stunning; many calves and some pigs are first stunned with a hammer; occasionally sheep and lambs are similarly stunned, but usually they are lifted on to a 'crutch' or trestle and stuck with a knife while conscious, after which their necks are broken by pressing back the head, the spinal cord being sometimes cut with the knife; Jewish slaughterers, for reasons of ritual, first throw the animal and then cut its throat in every case. The modern method, which is at present used for about one million animals yearly in Great Britain, consists in preliminary stunning with a specially designed pistol, after which the animal must be immediately bled.

From the humane point of view the superiority of the pistol over the pole-axe has been placed beyond serious question by the experiments conducted on behalf of the Corporation of London by the Medical Officer of Health (Dr. W. J. Howarth), the Superintendent of the Metropolitan Cattle Market (Mr. J. R. Hayhurst), and the Veterinary Surgeon at the Central Meat Market (Lieut.-Col. T. Dunlop Young). These officers found, in a number of trials with careful and experienced slaughtermen, that it took on the average 2·49 blows with the pole-axe to stun a bull, 1·23 blows to stun a steer, 1·27 to stun a cow

and 1·55 to stun a large sow or boar. With careless or less experienced slaughtermen the results would have been still less favourable. On the other hand, with a particular captive-bolt pistol, 542 bovines were stunned with 543 shots and 712 swine were stunned with 715 shots. Starling and Foster found that when the throat is cut with exceptional skill (in the Jewish method) the duration of consciousness, as tested by corneal reflex and by purposiveness of movement, varies from 5 to 40 seconds, with an average in the neighbourhood of 20 seconds. The qualitative superiority of the pistol over the knife, from the humane point of view, may be regarded as established, though there is some difference of opinion as to the quantitative aspect of the matter. However, Sir Arthur Mayo-Robson has described an important *post-mortem* test which does not appear to have been applied in the investigations under consideration: it consists in examining the meninges. Dr. Pfister, Director of the Zurich Abattoir, has found that when animals have been stunned before killing their meninges are normal, whereas in animals killed without stunning, as many millions are in Great Britain, the meninges are intensely congested, a fact which proves that suffering has occurred. Finally, the use of the knife has to be learned by practising upon living animals.

The captive-bolt pistol does not involve danger to the slaughterman or to bystanders, and its use calls for only such reasonable care as may fairly be demanded from a tradesman. The Meat Traders' Federation collected for the London County Council inquiry 15 examples of alleged accidents occurring with 'humane killers' between 1913 and 1920, but of these 5 turned out to be cases of suicide and 4 to be otherwise irrelevant. Of 5 genuine and 1 suspectedly genuine accidents, 5 occurred with pistols of the free-bullet as distinct from the captive-bolt type, and in the remaining case the type of pistol was not specified.

There are, however, other considerations which cannot be quite so easily dismissed. The most difficult of these is the allegation that pigs do not bleed so freely when shot as when killed by the old-fashioned methods, and that shot pigs are therefore less valuable for the manufacture of export bacon. It is also alleged that the flesh of shot pigs is more liable to be disfigured by 'blood splash.' The Corporation of London's research negatives the second of these allegations but leaves the first undecided: not only scientific authorities but also those engaged in the trade are divided on the subject, and further trials are called for. Doubtless a great deal depends on the precautions taken to promote bleeding immediately after shooting. In any case, it should be borne in mind that in large factories the pigs, when hoisted, are attached to a travelling conveyor, and owing to the weight of the animal the pressure of the chain on the leg will cause suffering, apart from the use of the knife.

In the case of sheep the difficulty is somewhat different. If a sheep be lifted on to the crutch and then shot, its struggles are said to make manipulation of the pistol more difficult than that of the knife. If, on the other hand, it be shot on the ground, the labour of lifting it on to the crutch afterwards is increased. Thus a 7-handed gang slaughtering 100 sheep a day might need an extra hand, whose wages would possibly amount to 12*s.* 6*d.* a day. The increased cost of production would therefore be about 1½*d.* per sheep, or 0·025 pence per lb. of mutton. Such a small expense should not be allowed to obstruct the doing of what is clearly just and right; Switzerland, Holland, Germany, Sweden, and Denmark have set an example which Great Britain could follow.

In the Jewish method of slaughter, which is governed by a traditional ritual, the animal is first cast, after which its throat is cut with exceptional skill and elaborate precautions. From the humane point of view throat-cutting is not so satisfactory as stunning, but the most serious objection to this method is the preliminary casting, which in the opinion of Starling and Foster involves definite cruelty, sometimes of a serious character. The Jews are by nature and tradition a humane race, and it should not be impossible for their experts to devise some modification of the procedure which will satisfy all the requirements of the situation. Indeed, so recently as Mar. 17, an important test was held at Brixton of a new apparatus designed by Mr. H. Weinberg to obviate the cruelty involved in casting. It is understood that a number of veterinary surgeons who were present were satisfied that a great advance has been made, and it is to be hoped that mercenary interests will not prevent Mr. Weinberg's apparatus from receiving a more extensive trial.

The compulsory training and licensing of slaughtermen is a pressing requirement, for while most slaughtermen are fully trained before they use the pole-axe, there is no adequate provision for the enforcement of this elementary precaution against the infliction of unnecessary suffering. But perhaps the most serious defect of our slaughtering system, both on humane and on hygienic grounds, is the lack of adequate control and inspection of slaughter-houses. In the more advanced of the Continental countries, private slaughterhouses have been extensively replaced by public abattoirs, but unfortunately in Great Britain private slaughterhouses still exist, and their licences have a capital value which opposes a strong vested interest to the movement for reform. The financial cost of doing what is right in this case is by no means an inconsiderable one. Obviously, however, the element of fear can be much diminished in a properly designed public abattoir, which also facilitates supervision for humane and hygienic ends. Hence public abattoirs alone are tolerable in towns, while in country districts a rigorous system of inspection and control by public officers is called for. The hardship which would be inflicted on the "slink" trade in meat from tuberculous animals could be softened by a good system of insurance.

It will be seen that while a very substantial body of facts may be regarded as established in connexion with humane slaughtering, there are other facts—and particularly as regards the effect on the quality of bacon and the psychological element in the suffering of the animals—which call for authoritative investigation. It is essential that the experimental work involved should be carried out by disinterested scientific men, adequately familiar with the canons of scientific method. However, apart from prejudice and conservatism and the professional pride taken by slaughtermen in a highly skilled trade, which they have learned by long apprenticeship, the opposition to reform is based on mercenary considerations. Even if the shot pig should prove to be somewhat less valuable for export bacon than the pig which has been more painfully killed, the question will arise whether the economic motive should prevail over the ethical.

The Ministry of Health proposes two alternative by-laws for adoption by local authorities, but does not enforce their acceptance. By-law 9a requires that all slaughterers except Jews shall stun the animal before killing it, except in the case of sheep. By-law 9b is similar, but it applies also to sheep and specifies the use of a mechanically operated instrument—that is, in practice, a pistol. Out of some 2,000 local authorities only 226 (including the London County Council) have hitherto adopted the stricter by-law, though the number is growing in response to propaganda by the Royal Society for the Prevention of Cruelty to Animals, the Humane Slaughter of Animals Association, and other humanitarian bodies. The adoption of the by-law may put a district at an economic disadvantage in its competition with neighbouring districts for the patronage of butchers, many of whom are prejudiced against the pistol. The Sanitary Committee of the Corporation of London has therefore passed a resolution to the effect that the time is now opportune for the issue of definite regulations which should be of general application throughout Great Britain, and that "in order to secure uniformity such regulations should be issued as compulsory regulations by the Ministry of Health." Presumably the Government will hesitate to

(*Continued at foot of first column next page.*)

The Veterinary Record.

28th May, 1927.

R.C.V.S. ANNUAL MEETING AND COUNCIL ELECTION.

During the past week all members will, we trust, have recorded their votes for the Election of Council of the R.C.V.S., which is to take place at the Annual General Meeting to be held at 10 Red Lion Square, on Thursday next, June 2nd, at 12 noon. The last date for the receipt of voting papers was May 26th, and as there are no less than 13 candidates, including the 8 retiring members, for the 8 vacancies, it is likely that more than usual interest will attach to the declaration of the Poll.

The Annual Report, which has been despatched to members, will be open for discussion at the Annual Meeting, but though it contains matters of unusual importance, it is not likely to cause much debate. It is a very brief record of the labours of the Council during the year, and ought to be read with attention by every member who has the interests of the profession at heart.

After the Annual Report has been passed the President will distribute prize certificates to the winners of the Fitzwygram, Williams and Walley Prizes for the year. Members of Council and Prize Winners will wear the appropriate academic dress, but the wearing of gowns is optional for other members.

This meeting will afford an opportunity for admiring the newly-furnished Council Room, and for making an inspection of the College Library, the use of which is growing rapidly, especially among the younger members of the profession.

We, therefore, strongly recommend all members who can manage to be in town on that day to spend an hour at the headquarters of their profession, and to lend their support to the President, Colonel Brittlebank, who will preside over the meeting.

There will also be an opportunity of attending the Annual Meeting of the Victoria Veterinary Benevolent Fund, and of hearing of the good work done by this important veterinary charity. The Annual Report shows that over £1,200 was distributed in relief last year to widows and orphans of veterinary surgeons, and to members who have fallen on evil days. This is truly a work which deserves the sympathetic support of all members.

(*Continued from previous page.*)

take the necessary action until it feels itself supported by a well-informed public opinion, but the subject is an unpleasant one, and the public naturally prefers to know as little of it as possible. In the face of this situation, no apology is needed for having brought it to the attention of scientific men, who are *ex hypothesi* opposed to obscurantism.

CLINICAL AND CASE REPORTS.

Tuberculin Testing - A Subpalpebral Method.

By R. H. Smythe, M.R.C.V.S., Camborne.

Although, in many ways, the intradermal method of testing has advantages, it does not always prove reliable, and the *post-mortem* examination of a non-reactor often provides a thrill. Until a certain degree of efficiency is acquired, there is a risk, particularly in the Channel Island breeds, of the needle unsuspectedly penetrating the entire thickness of the skin. Again, skin reactions are not always easy to interpret : far too great a number of doubtful reactions are encountered at the first reading and the "double test," unfortunately, only dispels a limited number of these.

The subpalpebral method, as practised by the writer, is a simple operation, its technique is fool-proof and the reaction, if any, is definite and reliable.

Method of Application. The tuberculin used is the same as employed for the intradermal test. The site of injection is the external surface of the base of the lower eyelid, immediately above the rim of the orbit. Any aseptic syringe may be used, which is capable of handling two minims of tuberculin, and is fitted with a fine needle, half an inch in length. An ordinary "dental" syringe, with interchangeable needles, is suitable.

No preliminary clipping or shaving is required and the use of irritating antiseptics in the region of the test is not advisable.

The animal is held by nose and horns by an assistant. Steadying the eyelid with the left hand, the operator pushes the needle, at a right angle to the surface of the skin, directly into the base of the lower eyelid, so that the point enters the soft tissues immediately below the free portion of the lid. The tuberculin is injected and the animal liberated.

Reaction. In affected animals, the reaction takes the form of a marked, easily-visible swelling involving the lower eyelid and the infraorbital region, and in many cases it is accompanied by the discharge of muco-purulent fluid from the internal canthus. This discharge, however, is not a constant feature and may be disregarded. The frequency of its occurrence probably corresponds with the ability of the animal to react to the ordinary ophthalmic test.

The subpalpebral reaction is visible at the twenty-fourth hour : it reaches its maximum at forty-eight hours and gradually recedes, so that at the seventy-second hour there is seldom any swelling remaining.

The advantages claimed are as follows :—

(1) The technique is simple and not unduly dependent upon the skill of the operator, the tuberculin being injected subcutaneously and not intradermally. No clipping is required.

(2) One injection only is necessary.

(3) Any reaction is obvious at the first reading. Affected cattle can be detected at a distance of several yards by their altered facial appearance. If required, the degree of reaction can be measured by calipers, precisely as in the case of the intradermal test. In the writer's experience,

there are far more reactions from the former than from the latter test in advanced cases. Large quantities of tuberculin may be injected into the subpalpebral site in healthy animals without obvious swelling resulting.

(4) The method may be employed in conjunction with either the subcutaneous or the intradermal test, if desired. In very advanced cases, when employed in conjunction with the latter, the subpalpebral region is frequently the only seat of reaction.

The Double Intradermal Tuberculin Test in Pigs.

By F. Beckett, M.R.C.V.S., Blandford.

The following notes may be of interest to those who have not yet had the opportunity of testing swine for tuberculosis by means of the intradermal method.

The herd tested consisted of 28 sows and one boar. They were chosen because the farm upon which they lived was primarily used as an isolation farm for cattle, all of which had reacted to the tuberculin test.

Technique. Each pig was caught by means of a rope round the snout and pulled up to a post. The site chosen for injection was the skin at the back of the ear near to its base—this was well scrubbed with spts. vini. meth.

A syringe of 1 cc. capacity, attached to a short dental needle, was used, and 0·1 cc. of tuberculin injected. Great care was taken to make certain that a small pea-like enlargement had been obtained in every case. This enlargement was approximately 5 mm. in size.

The sensitising dose having been injected, the pigs were turned out.

The animals were got in in 48 hours' time, and the second or test dose injected, after examining the site of injection. The injection was given exactly in the same place as the previous one, no difficulty being found in spotting the original site. In sound pigs but little increase in size of the swelling was found. The pigs were again turned out.

Twenty-four hours later the animals were again got in, and by putting three or four in a small pen roping each individual pig was unnecessary.

The injected area was examined and in sound pigs no œdema, heat or tenderness could be found, and little or no increase in size after the second injection.

In the tuberculous pigs much enlargement, œdema and heat were noticeable. As to whether the pigs were actually tender or merely restive, it was somewhat difficult to decide. All pigs with considerable increase in the size of site, together with œdema and heat were classified as tuberculous.

The result was as follows:—7 sows and 1 boar passed the test, 21 sows failed. It was then decided to slaughter and *post-mortem* 10 pigs, with the following result:—

Sow No. 54—passed the test. No tuberculous lesions found.

Sow No. 6—passed the test. No tuberculous lesions found.

Sow No. lost—passed the test. No tuberculous lesions found.

Sow No. 21—failed the test. Pharyngeal glands affected.

Sow No. 29—failed the test. *No lesions found.* This carcase later passed sound by inspector.

Sow No. 51—failed the test. Pharyngeal lymphatic glands affected.

Sow No. 37—failed the test. Pharyngeal lymphatic glands affected.

Sow No. 36—failed the test. Liver affected.

Sow No. 40—failed the test. Pharyngeal and mesenteric lymphatic glands affected.

Sow No. 38—failed the test. Pharyngeal lymphatic glands affected.

A Parturition Problem.

By W. E. Blackwell, M.R.C.V.S., Towcester.

Quite recently I have had a parturition case which called to mind several previous cases of the same kind, about which I had made notes. Having made many mistakes myself, with consequent loss of reputation and live stock, I think it worth while to place on record what I believe to be the correct solution of this problem. To many, of course, it may not be a problem at all, but I feel sure there are some, like myself, who are very liable to make mistakes and it is to these and for these, especially the young practitioners, that I write these notes.

Here is a typical case:—

Subject.—Shorthorn heifer—first calf. The owner was not certain whether her time was up or not, as she had been with some others running with the bull.

History.—The heifer had been paining during the previous twenty-four hours, but her efforts lacked vigour, and were intermittent in character. The owner consequently assumed there was something wrong, probably a dead calf.

Symptoms.—A quiet phase possessed her when I saw her first. She gave no evidence that she was about calving. I explored, and found calf alive and very vigorous, perfectly normal presentation and so forth. Relaxation of the *os uteri* was only half complete and the external parts showed a similar degree of preparation.

I decided to give the heifer more time, in view of the fact that this was her first calf. It was evening. I left her until the following morning.

In so doing, I told my client that if this case followed the usual course the heifer would be quite prepared for calving in twelve to eighteen hours, but the calf would be dead.

By way of explaining this, I remarked that it appeared to be uneven timing on nature's part, for whereas the fœtus was quite ready for delivery, the heifer appeared at least twelve hours late. I added that the course I advised seemed to me the lesser of two evils, and that to attempt delivery when the heifer was so unprepared, would be both cruel and unwise.

18 *hours later.*—Fœtus dead. Natural lubrication gone. Os uteri and external parts fully relaxed and labour pains strong and frequent. Vulva much swollen.

Procedure.—A stout rope was tied round the heifer's neck and the neck chain unfastened. The rope was then secured to the manger, allowing sufficient to permit of her lying down in comfort if she felt like it. Ropes were attached to forelegs of fœtus and then to pulleys, and gentle traction applied.

Delivery was difficult but uneventful. Fœtus full-timer, bigger than normal, but otherwise as usual. No hæmorrhage and heifer cleansed soon afterwards.

Next day.—Heifer up feeding, apparently comfortable. Vulva contracted to normal. No straining.

Two days later.—Progress satisfactory. I left syringe and antiseptic and asked them to syringe her out well twice daily, also stimulants and tonics.

Five days later.—Owner sent postcard—serious delay on his part, I thought. On my arrival I found what I half expected, vulva much swollen, vaginal passage blocked with sloughs, heifer straining badly, ears back, anxious expression, case hopeless. I worked at her for an hour, but she died the following night. I thought they had neglected her.

Remarks.—In a few previous cases I had found that no further relaxation had taken place after waiting eighteen hours, thus making delivery more painful and difficult.

What happens in these cases is, I think, this :—When the heifer is first examined, the membranes are intact, and one is able to state sometimes that the calf is alive, from the fact that it vigorously withdraws its foreleg when this is pulled forward.

If the presentation is a breech one, then it is not so easy to say whether the calf is alive or not. A live calf will not always respond *in utero* when one's fingers are pushed into its mouth. If the membranes remained unbroken, the relaxation of the uterus and other parts would, no doubt, occur, but the membranes get broken in these cases before the calf reaches the pelvis, and then the natural means of dilatation are gone and the preparation for delivery remains unadvanced. The fœtus then dies in the course of four to six hours, the natural lubrication being absent, and the membranes collapsed. The heifer experiences much pain when she strains because of the two opposing surfaces, normally lubricated, having become dry. Then she ceases to strain until such time as the irritation becomes so great that she strains violently, regardless of the consequences. Then laceration follows the advance of the fœtus towards delivery. The parts become inflamed, congested and swollen, and death results from septicæmia.

To sum up, in my opinion the procedure should be as follows :—

1. Ascertain, if possible, if the calf is alive.
2. See if all the membranes are intact.

If the answer to these two questions is in the affirmative, then leave the case for four hours only, and at the end of that time explore again. If the position is unchanged, then give another four hours' time and so on.

3. If the calf is alive and the membranes are broken, deliver it at once, no matter what stage the relaxation has reached. The natural lubrication over the calf and uterus will be absent in four hours if you leave it, and death of both heifer and calf will result.

I may remind my readers that when the fœtal membranes are broken and the liquor amnii escapes, the intimate union between the cow and calf is severed to a large extent, and the calf dies in four to six hours in consequence, death being expedited by the violent contractions of the uterus on the unprotected calf, resulting, in all probability, in the crushing of the umbilical cord. The fact that the heifer cleanses soon after delivery goes to emphasize the complete separation that has taken place between the mother and her offspring.

ABSTRACTS.

Enemata by the Transcaecal Route in the Treatment of Colic in Solipeds.

(Dr. A. Roquefort : Thesis for the Doctorate in *Veterinary Science*, Paris, 1926.)

The introduction of liquids into the cæcum, after puncture with a trocar, seems to have been only very rarely practised. Cadiot considers the method dangerous ; the end of the cannula may leave the intestine, and the liquid be injected into the peritoneum.

This accident may, however, be avoided easily, and the advantages of a cæcal enema are certain.

The operation is reserved for cases of repletion of the cæcum or the colon which persist after the usual remedies. Used first for sand disease, the treatment will render the greatest service in acute or chronic intestinal indigestion, caused by meteorization, stasis, obstruction or obstipation, coprostasis or calculi.

A flask with two tubulures and bellows is used, and oil alone (two litres) is introduced.

Eight observations have been reported which show the efficacy of this remedy which is easy, painless, and without danger.

(Ex. *Revue Générale de Médecine Vétérinaire*, January, 1927.) R. L. Higgins.

On an Infectious Enteritis due to Bacillus enteritidis (Gaertner) in a herd of Cattle.

(Dr. Erlich Lehr, *Berliner Tierärztliche Wochenschrift*, Vol. 43, No. 17, 29th April, 1927, pp. 274-280.

B. enteritidis Gaertner was found to be the cause of an infectious illness which occurred amongst grown cattle.

The bacillus was demonstrated to be present in fæces, urine and milk by suitable methods.

The Widal reaction was a valuable aid in detecting infected and suspected animals. Agglutinins seemed to occur in the blood at a very early stage. A dilution of 1 : 100 was taken as the limiting value.

The affected or suspected animals could not be detected by clinical means in all cases at the beginning of the illness. The most noticeable indication in many cases consisted of a watery diarrhœa, often mixed with blood and mucous, and some of the cases may therefore have been missed. In those cases which ran a not very marked course the most important symptoms were increasing impairment of the nutritive condition and disturbances in fodder consumption. Initial fever together with loss of appetite always seemed to be the first signs of illness. Progressive heart weakness with unusual acceleration of the pulse was observed in almost all cases. Frequently in the ecurse of the illness paresis of the rumen took place, especially in the bad cases of diarrhœa. Also, pharyngitis was often present, and, in addition, in most of the cases occurring amongst the cows, a general drying off of the milk, and abortion in pregnant animals. We were unable to ascertain clearly whether and to what extent in each case the air passages were involved as a cause of the illness, since

mixed infection was present in many cases. Breathing trouble of short or long duration was marked in almost all animals, and its independent pathological nature could be demonstrated in the animals *post-mortem*.

Unfortunately, the pathological and anatomical picture was largely spoilt by the simultaneous and extensive occurrence of liver fluke. The severe catarrhal inflammation of the mucous membrane of the intestine, in parts hæmorrhagic, which was particularly marked in the duodenum, cæcum and colon, might certainly be attributed to the Gærtner infection. The same holds good for the septic phenomena (enlargement of the spleen, hæmorrhages under the epicardium and in the mucous membrane of the bronchii.) The sero-fibrinous inflammation of the peritoneum might with great probability be attributed to the extensive liver fluke infestation. We are still in doubt as to the cause of the gelatinous saturation of the subserous glands in the region of the rennet stomach, neck of the rumen and intestinal mesentery. D. K.

The Lymphatic Ganglia and Tuberculosis in Poultry' especially in Hens.

(SEIGFRIED in *Deutsche tierärztliche Wochenschrift*, Aug., 1925).

Hens have no lymphatic ganglia in the neck, or at the entrance to the thorax. The thoracic and lumbar ganglia do not exist. The glandiform organs, considered up to the present as lymphatic ganglia, consist either of the thymus (in the neck) or of the thyroids (near the entrance to the chest). There is, therefore, no ganglionic tuberculosis of these regions; the subcutaneous hard nodosities observed in the neck are tuberculous granulomæ of the thymus (30 per cent. cases of chronic generalised tuberculosis). Besides tuberculosis the thymus shows senile involution and accidental or cachectic involution. The histological structure of the thymus and the thyroid glands of the hen is identical with that of man and mammals.

Geese and ducks possess two groups of lymphatic ganglia; the thoracic ganglia, situated near the jugular vein, and the lumbar ganglia at the level of the sexual glands, between the aorta and the inner edge of the two kidneys.

[*Ex. Revue Générale de Médecine Vétérinaire*, February, 1927].

R. L. HIGGINS.

TUBERCULOSIS IN DAIRY PRODUCE.

"While it may be advisable to take all reasonable and practicable precautions against risk of spreading tuberculosis through the milk supply, any benefit resulting from efforts of the kind will be discounted if nothing be done to check contamination through other channels," says the Agricultural Correspondent of *The Times*. "Butter and cheese, for instance, are sources of danger, and, inasmuch as great quantities of these come into this country from sources outside our control, it is both an injustice to home producers and a danger to the public to impose exacting regulations upon milk-selling dairies and allow the produce of oversea dairies to reach the householders regardless of its purity and freedom from disease germs. Dr. H. A. Mitchell, of Liverpool, has declared that even in heavily salted butter tubercle bacilli were capable of producing infection for 99 days. If this be the case—and there should be no doubt on the point—it becomes, as he says, "a farce to insist upon giving a child sterilised milk and at the same time plenty of ordinary butter on its bread."

DIVISIONAL REPORT.

Central Division.

The reading of a paper on "Some Notes on Treatment of Interest to Clinicians," by Professor J. McCunn, of the Royal Veterinary College, proved a big attraction on the occasion of the last-held meeting of the Central Division, which took place at 10 Red Lion Square, London, on May 5th, 1927. As was to be expected, from the popular nature of the subject, the paper produced a long and animated discussion (opened by Professor Smythe) and both paper and discussion are reproduced at the commencement of this issue of the *Record*.

The President (Major G. W. Dunkin) occupied the Chair, and there were also present Captain L. S. Balls, Mr. H. Bell, Mr. W. Brown, Captain R. Bryden, Mr. H. E. Bywater, Captain D. Reid Chalmers, Mr. B. S. Cockerton, Mr. L. B. A. Grace, Captain Ross Grant, Messrs. H. D. Jones, H. King, N. S. King, Major Hamilton Kirk, Mr. G. H. Livesey, Professor James Macqueen, Professor J. McCunn, Messrs. J. W. McIntosh, H. J. Parkin, W. Perryman, Major P. W. Dayer Smith, Professor A. R Smythe, Mr J. Stephens, Captain R. J. Stow, Mr. C. N. Thompson, Captain W. K. Townson, Messrs. A. C. Wild, F. W. Willett, J. Willett, Professor G. H. Wooldridge, Lieut.-Col. T. D. Young, and Captain J. F. Macdonald, *Hon. Secretary*.

Visitors.—Messrs. J. M. Armfield, B. A. Claxton, N. Mackay, E. Messervy, J. S. Steward, J. B. White and C. E. Woodrow.

Apologies for absence were received from Major F. T. G. Hobday, Captain G. D. Martin, Mr. J. W. Pritchard, Mr. S. H. Slocock, and Mr. E. L. Stroud.

The *minutes* of the previous meeting of the Division, having been published in the *Record*, were taken as read and were signed as correct.

The PRESIDENT now referred to the pleasure which they all felt at being restored to their customary place of meeting after the considerable period of absence which had been necessitated by the process of refurnishing and redecoration to which the Council Room of the Royal College had been subjected. He pointed out to the meeting that strict instructions had been received that no smoking could be allowed in the room and that the former practice of displaying *post-mortem* specimens on a table in the room could no longer be followed.

New Fellows.—Messrs. W. T. Ferguson and L. B. A. Grace were elected as new Fellows, and Captain S. J. Motton, of Penzance, as an Honorary Fellow, while Mr. W. E. Howell was nominated to Fellowship.

MORBID SPECIMENS.

Captain L. S. Balls: I am sorry to have transgressed by bringing this morbid specimen into the room, Sir. (Laughter). It is the upper jaw of a horse with nine incisor teeth. This horse came to the stud a few years ago and had then seven incisor teeth in the upper jaw. He had to be killed a fortnight ago and it was then found that the upper jaw contained nine incisor teeth. Another specimen I have is a tumour from a dog's head. This tumour had eaten into the ramus of the jaw on the right-hand side and the tumour could be felt when the mouth was open, involving the soft palate. In the end it was growing so big and so quickly that it was pressing the right eye out of the orbit. The dog was destroyed and on *post-mortem* the tumour, which was an osteoma, was cut out. It was growing from the ramus and the side of the jaw was eaten right away.

Mr. H. D. JONES: I have on the table outside the second, third and fourth cervical vertebræ of a horse. The axis shows a lot of exuberant calcification on the superior surface and the third and fourth show it on the under surface. This horse was rather stiff in the neck, which he could not depress, and as he was in poor condition he was destroyed. I suspected tubercle, but no test was applied, and I should like to know whether the members think it a case of tuberculosis or not.

Mr. J. WILLETT: You will see, outside, two pedal bones and the corresponding naviculars. These have come from a hunter carrying seventeen stone in Leicestershire, which had a contracted foot on the near side. Three years running I operated by splitting the foot, and it eventually spread 1¾ ins., but this year I advised the owners that they should not send him up again.

The horse was killed, and the particular matter to be noted in the contracted foot is the absorption of bone which has taken place in the surface of the pedal bone; you will see also the considerable amount of navicular disease that has supervened.

The HON. SECRETARY: I have outside a morbid specimen of a dog's heart, which shows extensive adhesion between the pericardium and the heart wall. I did not see the case very early on and when I did do so the animal was in a very advanced state of debility and there was a good deal of fluid in the abdomen, while the heart action was very bad. The owner was anxious to have something done for him, so the animal was tapped and about one quart of fluid taken out of the abdomen. That did not empty him, but it was as much as we thought he could stand. He soon filled up again and in forty-eight hours we withdrew another pint, and forty-eight hours later another quart. Subsequently it was seen by all concerned that the case was hopeless and we destroyed him. The adhesion of the pericardium to the heart wall seems to be a very old-standing thing—it is quite fixed.

Captain REID CHALMERS: I should like to bring to the notice of members a case that I think would be of interest to them. A liver-and-white spaniel was shown to me by the owner, who had been out shooting with him. It was covered with cuts as though it had been through barbed wire, and the skin was also peppered with holes about the size of a split pea. There were no markings on the legs but only on the body. The largest holes were situated behind the ears. There was no irritation, strange to say. I saw it twice and on the second occasion I gave it a stock vaccine (streptococci) and the owner now says that the markings are disappearing rapidly. He can throw no light on their occurrence.

Major H. KIRK expressed the opinion that the dog had been shot as it had been taken out on a shooting expedition.

Several members having complained of the restriction which prevented the members from having the specimens before them,

Professor MACQUEEN remarked: Could we not have the customary coroner's inquest and retire to view the body?

The PRESIDENT acquiesced in this suggestion and the members adjourned to the lobby to examine the specimens.

Upon their return the PRESIDENT invited the meeting to discuss the cases, and called upon Professor WOOLDRIDGE who said that in regard to the foot case shown by Mr. J. Willett, in his opinion the alteration in the pedal bone was not one of absorption, but indicative of the site of a keratoma. In regard to the neck bones it had not occurred to him that the case was likely to be one of tuberculosis. Although there were some osteophytes present at the centres of the bones the main lesion appeared to be in the spine of the axis—an unusual position. One would have suspected that the trouble arose from a fistula involving the ligamentum nuchæ.

Mr. J. WILLETT: With reference to the foot, I am rather surprised that Professor Wooldridge did not find any absorption in the pedal bone: I have tried to find a keratoma, but have failed to do so. There is a depression in both bones; one is much deeper than the other, but I could not find any keratoma to cause either.

The PRESIDENT then called on Professor McCunn to read his paper, which, as recorded elsewhere, was followed by a good discussion.

Major KIRK said he would like to propose a hearty vote of thanks to Professor McCunn for his very interesting and varied paper and to Professor Smythe for so ably opening the discussion.

The vote of thanks was accorded with enthusiasm and the PRESIDENT expressed the indebtedness of the meeting to

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those who had brought *post-mortem* specimens, in regard to the displaying of which he hoped that they would be able to make more satisfactory arrangements for the future.

A tribute to the President for his conduct in the Chair brought a highly-successful meeting to a close.

J. F. MACDONALD,
Hon. Secretary.

STUDENTS' CONTRIBUTIONS.

The Ritual Slaughtering of Animals.

By A. SHOSHAN, Class "D," R.V.C., London.

The practice that prevailed among the nations of antiquity (other than the Hebrews) of cutting off a limb from a living animal and eating it, is condemned in several passages in the Bible.

The Phœnicians and the Assyrians used animals for sacrifices, but had no dietary laws.

The Mosaic, like the Egyptian laws, distinguished between clean (kosher) and unclean food animals.

The Egyptians did not eat the meat of a cow, since the cow was the sacred animal of Isis. This dietary law was observed by the Egyptians until their country became Roman.

The Historian, Flavius Josephus (born 37 A.D.) in his book, "Against Apion," writes:—

> 138. "Now, as for our slaughter of tame animals for sacrifices, it is common to us and to all other men: but this Apion (the grammarian and antiquarian) by making it a crime to sacrifice them, demonstrates himself to be an Egyptian.
>
> 139. "Yet if all men had followed the manners of the Egyptians, the world had certainly been made desolate as to mankind, but had been filled full of the wildest sort of brute-beasts, which, because they suppose them to be gods, they carefully nourish."

RITUAL SLAUGHTER AS PRACTISED TO-DAY.

Cervical bleeding is the common method of killing food animals amongst Jews and Mohammedans.

Mohammed decreed a series of regulations to the Believers concerning food animals. In the Vision of the Table he says:—

> "Ye are allowed to eat the brute cattle, other than what ye are commanded to abstain from, except the game which ye are allowed at other times, but not while ye are on pilgrimage to Mecca.
>
> "Ye are forbidden to eat that which dieth of itself, and blood, and swine's flesh, and that on which the name of any besides God hath been invocated, and that which hath been strangled, or killed by a blow, or by a fall, or by horns of another beast, and that which hath been sacrificed unto idols."

The idolatrous Arabs in killing any animal for food used to consecrate it, as it were, to their idols by saying "In the Name of Allat or Al Uzza."

The pagan Arabs used to set up stones near their houses, on which they superstitiously slew animals in honour of their gods. For this reason, Mohammedans always says, "Bismillah," or "in the Name of God," whenever they kill animals for food. If this is neglected they think it is not lawful to eat them.

Food animals permissible to Mohammedans are camels, oxen, sheep, goats and wild bovines.

Food animals, according to the Mohammedans, should be killed only by slaughter; the slaughterman offers a short prayer, and, with his face towards the South, says: "In the Name of the most merciful God."

The animal being cast, he cuts the throat—the knife cuts through the trachea, œsophagus, carotids and jugulars.

The Arabs in Palestine, on humanitarian principles, do not allow the hair of the throat to be plucked before the animal is killed.

The Jewish method of killing food-animals is very ancient and was probably practised by the early Hebrews.

No definite mode of slaughter is prescribed in connection with the preparation of an animal for sacrifice. The term "Shahat" is used, but this denotes merely that the animal is to be killed, and not how it has to be slaughtered. There can be but little doubt that in slaughtering sacrificial animals, the priests followed some uniform mode akin to that which was later adopted by all Israel, and which is known as "Shehitah."

Speculating on the etymology of the word "Shahat," the Rabbis endeavoured thereby to establish, on a Scriptural basis, the law that an animal should be slaughtered by cutting the throat. The opinion, however, was that all the laws of Shehitah were given orally to Moses by God.

The slaughtering of animals is entrusted only to persons versed in the Law and skilled in their work, and one who is empowered to perform the ritual slaughter of cattle and poultry is called a "Shohet."

Shehitah must not be performed by the following:—deaf-mute, idiot, minor and one who is intoxicated. An old man whose hands tremble should not practise. Some authorities consider women incompetent to perform Shehitah because they are apt to faint during the act of slaughter.

At the present time the custom is to allow no one to practise unless he has passed a rigid examination before a competent authority in all the laws of Shehitah and "Terefah" (non-kosher), especially those pertaining to the examination of the lungs. He must also hold a written certificate of his knowledge, of his expertness in examining the knife, and of his skill in slaughtering.

Knife.—The length of the knife must be twice the width of the throat of the animal. The knife must be sharp, smooth and without any perceptible notch, and must be thoroughly examined before the slaughtering, by passing first the finger and then the finger nail over its edge on both sides.

It should be similarly examined after the slaughtering, and if a notch should then be found in it, the animal becomes ritually unfit for food.

Before slaughtering the following blessing is pronounced:

> "Blessed art Thou who sanctified us with His Commandments and commanded us concerning slaughtering."

The Process.—The act of slaughtering proper consists in cutting through the trachea and œsophagus in mammals, or either of them in birds.

The Rabbis summarised the many details of improper slaughtering under the following five laws, which were supposed by them to have been delivered by God to Moses: (1) delay; (2) pressing; (3) digging; (4) slipping; (5) tearing.

Soon after Shehitah, the Shohet must examine the throat of the animal, and ascertain whether the windpipe and the gullet are cut through according to the requirements of the law.

In the case of birds and permitted wild beasts, some of the blood shed in the course of Shehitah must be covered with earth or ashes.

The killing of an animal and its young on the same day is prohibited.

Isserles, an authority on law, confined the right of acting as a Shohet to those who have already slaughtered at least three times in the presence of a Rabbi, and he also required him to be a Talmudic scholar, as is almost universally the case.

The Shohet must not be accused of having neglected his duties.

Religious and Ceremonial Killing of Animals.

Idolatrous killing of animals is probably prehistoric—the ancients indulged in sacrificing various species of animals, even man was burnt on the altar to please Molech.

The Hebrews, who were the first to appreciate the monotheistic ideas of the powers governing the universe, have gradually modified the nature and process of the fashionable fetish; thus, around a nucleus of distinctiveness the whole organism of the chosen people was built up and strengthened by the foundations which were laid down by Moses.

It is quite true that parallels to the dietary laws of the Israelites are to be found in usages of other ancient nations, but what Mosaism did was not so much to originate those laws as to give them a higher meaning and purpose, to make them effective instruments for safeguarding the distinctiveness of Israel.

Sacrificial killing, as practised by the Jews, came to an end with the destruction of the Second Temple (70 A.D.).

Sacrificial killing is still practised by some religious bodies.

Catlin, in his book: "North American Indians," writes: "Feasts are often made, and dogs and horses are sacrificed to a 'man's medicine.'"

Zoroastrianism, once the national religion of Iran, practised sacrificial killing of animals. In the centre of the Zoroastrian Church was the holy fire on the altar. In the sanctuary of these temples various sacrifices, and high and low masses, were celebrated, such as the offering of meat, milk, etc.

Whilst Buddhism rejects the sacrifices and the ceremonies associated with them, Brahmanism recognises a special order of priests who look after the details of the ceremonial rites, including the preparation of the offering-ground, the construction of the fireplaces and altars.

The sacrificial rite recognises two kinds of sacrifices, *viz.*, meat offering and juice of the soma tree.

Lastly, it should be mentioned that the Samaritans still practise the sacrificial killing of the Paschal Lamb. This ceremony is performed annually on the Mount Gerizzim.

Bibliography.—"Talmud." Flavius Josephus. "Judaism as Creed and Life." "Jewish Encyclopædia." The Koran. Ostertag—Wilcox. "N. American Indians"—Catlin. "Encyclopædia Britannica."

Intestinal Irrigation in the Treatment of Lymphangitis.

By D. E. Wilkinson, Class "C," R.V.C., London.

The subject of this note is an aged chestnut Shire gelding of the gross, lymphatic, "gummy-legged" type, standing 17.2 hands high and weighing 16 cwt.

For the past three years he has been subject to recurrent attacks of lymphangitis, some of them being of an obstinate character, taking two or three weeks to clear up. I have always feared he would develop chronic elephantiasis as a result.

The treatment usually adopted has been the administration of arecolin hypodermically, a dose of physic, fomentations and exercise, followed by mercuric potassium iodide and a course of digitalis.

He has always aggravated his symptoms by refusing to lie down when his leg filled and on one occasion had to be kept in slings for ten days owing to the acute character of the lameness during an attack.

Last year he was at grass for five months owing to the coal strike and came back much improved in general condition.

Careful dietary, including a daily ration of roots, a Saturday night bran mash and feeding entirely on long hay on Sunday, accompanied by half an hour's exercise every Sunday morning, kept him free from lymphangitis during the winter and spring, but during Easter holidays, these precautions were relaxed and on Tuesday, April 19th, he had another severe attack.

When I saw him on that day he was in very great pain, sweating in patches and "blowing" freely. His temperature was 106° F., pulse 80 and the lymphatic glands in the right thigh were very swollen and painful.

I gave him two tablets of arecoline compound (P.D. and Co.) hypodermically, a six drachm. alœtic physic ball and followed this up with 5 m. doses of Fleming's tincture of aconite every four hours in drinking water.

Next day his condition had generally improved. He was purging freely, the swelling was much less tense and painful, he was eating a little mash and some scalded hay, and the temperature had fallen to 101.5°. I had him gently exercised, the leg well fomented and massaged and prescribed mercuric potassium iodide in 5 gr. doses three times a day in a little bran. He continued to improve up to Sunday, 24th, when he suddenly relapsed. The swelling of the lymphatics in the groin returned, his temperature rose to 105° and he showed evidence of considerable pain.

Bearing in mind the beneficial effects of irrigation in intestinal toxæmias in the human subject, I decided to try it in this case.

I therefore passed the stomach tube by way of the left nostril and injected three gallons of hot water in which I had dissolved 85 grains of Dimol.

With the owner's consent all other treatment, except local hot fomentations and massage with soap liniment, was stopped so that we might accurately observe the result of this treatment.

During the night the bowels acted freely, without purgation, the fæces being of the consistency of cow-dung and very offensive.

Next morning the temperature was normal and although the limb was still swollen the swelling was not of a painful character and disappeared after half an hour's walking exercise.

The improvement was continuous and three days later he was put to light work.

The treatment was in this case so satisfactory as to be worth a further trial in similar cases and also in cases of laminitis in overfed, show animals.

Army Veterinary Service.

London Gazette—War Office—Territorial Army. Reserve of Officers.

May 17.—Capt. W. F. Wilson having attained the age limit, relinquishes his commn. and retains his rank (May 18).

Notanda.

Brown Swiss cows did not originate in Switzerland, as may be supposed from the name of the breed, but came from Western Asia, whence they were brought by the Huns when they invaded Central Europe. (*Nth. Amer. Vetn.*).

. . . . . .

As early as 1622, Gaspare Aselli found the chyle vessels, but correct explanation was possible only after the discovery of the thoracic duct and its opening into the circulation by Jean Pacquet and Johann van Horne and of the lymphatic vessels by Olaus Rudbeck and Thomas Bartholinus.

. . . . . .

Intravenously, in very small doses every second or third day, turpentine has a striking effect against chronic microbian disease, actuating as an oxidising agent and by stimulting phagocytosis. It causes fleeting of the leucocytes and is the only chemical agent known that augments phagocytosis. (*Nth. Amer. Vetn.*).

. . . . . .

The rate of growth of capons up to six pounds is not distinctly greater than that of cockerels. (University of Illinois, Ag. Ex. Sta. No. 278).

. . . . . .

According to the blood sugar theory of milk fever, postponing the first milking for 24 hours or over after calving prevents the disease by keeping the mammæ inactive during the danger period; that is, by keeping the blood sugar from draining off into the milk.

. . . . . .

Phosphorus was discovered by Brandt of Hamburg in the product of evaporated urine, in 1669.

H. K.

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Sept. 12-17th.—N.V.M.A. Congress at Torquay.

May 30th—Meeting of the Editorial Committee, N.V.M.A., at 4-30 p.m.

June 2nd—R.C.V.S. Annual General Meeting (Council Election), 12 noon, 10 Red Lion Square, W.C.

Annual General Meeting of the Victoria Veterinary Benevolent Fund, to follow the above.

June 2nd—Meeting of the Central Division at Red 10 Lion Square, W.C.

June 29th—R.C.V.S. Annual Dinner, 7-30 p.m., Hotel Victoria, Northumberland Avenue, W.C.

Obituary.

Professor John Penberthy, F.R.C.V.S.

We deeply regret to record the death, under tragically-sudden circumstances, of Professor John Penberthy, F.R.C.V.S., of Dean Hall, Newnham, Gloucestershire, which took place at Bath on Monday last.

Professor Penberthy, who was for many years veterinary inspector to the Bath and West of England Show, collapsed and passed away at the Guildhall, Bath, just before the start of the dinner given by the Mayor to the officials and principal citizens in connection with the Society's Show, which opened on the following day. The guests were kept in ignorance of the Professor's death, and the dinner proceeded.

In the death of Professor Penberthy the veterinary profession mourns the loss of one who filled a prominent place in both its academic and its political life. A member of the Council of the Royal College of Veterinary Surgeons from 1890 to 1902, he occupied the Presidential Chair in 1897, and the position of Vice-President in the years 1893 to 1895 and in 1898.

At the time of his death he held the post of Examiner to the Royal College in Medicine and in Meat Inspection, capacities in which he had officiated since the year 1920.

Professor Penberthy's death deprives the National Veterinary Medical Association, also, of a member who had for long taken an active interest in its welfare. He sat for a considerable period on the Council, and also rendered the Association splendid service in the capacity of Hon. General Secretary. He will also be remembered as the contributor of several valued papers to the Congresses of the Association and as the well-informed opener of many discussions on the efforts of others.

Professor Penberthy, who was 69 years of age, was appointed an inspector under the Contagious Diseases (Animals) Act in 1882, and was Professor of Pathology from 1888 to 1892 at the Royal Veterinary College. He was a Fellow of the Royal Society of Medicine, a Governor of the Royal Agricultural College, Cirencester, and a prominent member of the Central Chamber of Agriculture.

He had been a member of departmental committees on swine fever and foot-and-mouth disease, and was on the Advisory Council on Horse-Breeding.

He was the author of a number of works on veterinary science, including a text-book of equine medicine. During

the war he served in the Devon Regiment and was promoted to major. He was a magistrate for Gloucestershire, where he lived at Dean Hall, Newnham. The eldest son of Mr. William Penberthy, of Treworgie, Redruth, he was born in Cornwall on April 19th, 1858, and was educated at Fowey School and University College, London. He married Eleanor, daughter of Mr. John Rees, J.P., of Neath, and had one daughter.

We hope to publish, in next week's issue of the *Record*, an appreciation of Professor Penberthy, from the pen of one who knew him well.

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SHERLEY, William, Twickenham. Graduated, London, 15th December, 1873. Died 16th May, 1927.

WORLD'S POULTRY CONGRESS.

Mr. Mackenzie King, Prime Minister of Canada, will officially welcome the delegates to the World's Poultry Congress at the opening ceremony in Ottawa on July 27. The Governor-General, Lord Willingdon, will extend a welcome on behalf of the British Empire. At a mass meeting on the same evening, Mr. Lemieux, Speaker of the House of Commons, will open the proceedings for Canada, and other speakers will include Mr. W. M. Jardine, United States Secretary of Agriculture; Sir Francis L. C. Floud, representing the Ministry of Agriculture and Fisheries of Great Britain; Professor Don Salvador Castello, for Spain; and Professor Cavalier Alessandro Brizi, for Italy.

The Canadian National exhibit will include a pen of White Wyandottes from Mr. Mackenzie King's Kingsmere estate in the Gatineau district. These fowls originated from the stock of Mr. J. S. Martin, the Ontario Minister of Agriculture, who is the most famous breeder of White Wyandottes on the American continent. The Government of India will send an interesting exhibit, including specimens of the original Jungle Fowl (*Gallus Bankiva*)from which it is believed all domestic fowls have descended. Other specimens will be Aseel (the Indian fighting game), Hyderabad Game and Chittagongs.

IMPORTATION OF CANADIAN CATTLE.

Mr. Guinness, Minister of Agriculture, replying to Mr. Hannon in the House of Commons recently, said that his attention had been called to a recent resolution passed by the Birmingham City Council requesting that he shouldmake an Order, as contemplated by section 2 of the Importation of Animals Act, 1922, authorising the importation into Great Britain of non-tuberculous Canadian cows and heifers.

Mr. Day asked if the Minister of Agriculture had had many of these resolutions from councils in London and the provinces. Mr. Guinness: Yes, I think a sealed pattern resolution was sent round to the local authorities. A great many of the urban authorities responded and forwarded this ready-drafted resolution, but I believe that not a single rural county council accepted the advice given. (Laughter.) Sir R. Sanders asked if such an Order did not require the consent of the House. Mr. Guinness replied that that was the case. There was a great feeling of resentment against this body, which, without any foundation, had made the most alarming statements about the health of British cattle. (Cheers.) Lieutenant-Colonel Heneage asked if the right hon. gentleman had any information as to what were the vested interests responsible for sending round these circulars to local bodies. The Speaker said that that question did not arise.

FOOT-AND-MOUTH DISEASE.

"An American writer has been attacking this country for tolerating the presence of foot-and-mouth disease instead of adopting the slaughtering policy that has answered so effectively in that country. Our authorities have been wiser than the writer in question implies," says the Agricultural Correspondent to *The Times*. "They have not been so successful as they could wish in excluding the disease, but considering the greater opportunities for contamination coming in from centres of infection, our record does credit to the vigilance of the department responsible for the health of our livestock. The United States are fortunate in being so far distant from the nearest source of danger and, still more important, in not being subject to the inflow of foodstuffs of all kinds from disease-infected countries. It is surprising, however, that a responsible writer should be unfamiliar with the policy of this country in a matter of the kind."

"TRANSIT FEVER" IN STORE CATTLE.

In the North-East the number of deaths caused by what is known as "transit fever" in store cattle is regarded as very high. The Secretary of the Aberdeen County Executive of the Farmers' Union circularised veterinary surgeons in the counties of Banff, Kincardine and Aberdeen as to the number of cases that came under their observation in 1926. Eighteen replies were received and it was stated that in Aberdeenshire there were 79 deaths, in Kincardineshire 22, and in Banffshire 10. The veterinary officers pointed out that in 1926 "transit fever" was comparatively low, but that there were deaths where veterinary assistance was not sought. The Committee of the Union in charge of this matter advocate that following the Transit Order of April last, farmers should keep their cattle in open sheds for the first week before housing them.—*The Scotsman.*

"Amongst the passengers on the White Star liner 'Albertic,'which reached Liverpool yesterday from Canada." says the *Liverpool Post* of May 16th, "was Mr. Patrick Hamilton, a resident in the Dominion, who has attained some note for his poetic effusions. By profession he is a veterinary surgeon, engaged especially in research work. He has published several books of poems. His present visit to England is on account of health."

H.M. STATIONERY OFFICE PUBLICATIONS.

The undermentioned have been published during the week. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28 Abingdon Street, S.W.1; Cardiff: 1 St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120 George Street.

	Price Net	*Post Free*
STATUTORY RULES AND ORDERS, 1927:	s. d.	s. d.
399. Animal. Diseases of Animals. Order dated May 9, 1927, amending the Transit of Animals Order of 1927	0 1	0 1½

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

The Detection of Anthrax.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—With reference to your report on "The detection of Anthrax," at a recent meeting of Executive Committee of Aberdeen County Council, I would point out that "the local veterinary surgeon" is neither required nor requested to give a positive diagnosis. He is foolish to attempt to do so, and his report may be either "suspect" or "negative."—Yours faithfully, JAS. CONNER, Capt. M.R.C.V.S.

64 Broomhill Road, Aberdeen.

May 22nd, 1927.

The Editor acknowledges the receipt of the following:—Communications from Captains H. A. Idenden (Azraq), and A. W. N. Pillers (Liverpool), Miss D. Knight (Reading), and Mr. E. R. Smythe (Falmouth).